FINAL

Giacomini Wetland Restoration Project

Environmental Impact Statement / Environmental Impact Report

June 2007

California State Lands Commission

State of California

Point Reyes National Seashore
Golden Gate National Recreation Area

National Park Service
U. S . Department of the Interior

FINAL

Giacomini Wetland Restoration Project

Environmental Impact Statement / Environmental Impact Report

June 2007

Exhibit 2: Final Environmental Impact Statement/Environmental Impact Report and Mitigation and Monitoring Report for The Giacomini Wetland Restoration

Key Sections	Pages
Executive Summary	i-liii
Alternative D (Preferred Alternative)	xxii-xxvi
Affected Environment/Environmental Consequences	xxvi-li
Project Area Description/Baseline Conditions	32-37
Alternative D (Preferred Alternative)	82-92
Impact Avoidance and Mitigation Measures	98-102
Table 3. Summary of Impacts	103-136
Chapter 3. Affected Environment	137-342
Water Resources and Water Quality (Discusses potential for saltwater intrusion to public wells)	209-227
Special Status Fish and Wildlife Species	281-292
Flooding and Public Safety	300-305
Chapter 4. Environmental Consequences	343-678
Water Quality	446-466
Fish and Wildlife	500-564
Public Health and Safety – Flooding	571-582
Visitor and Resident Experience – Public Access Resources	626-643
Compliance Status	686-689

Final Environmental Impact Statement/ Environmental Impact Report

National Park Service/California State Lands Commission

Golden Gate National Recreation Area/Point Reyes National Seashore

Marin County

Since the early 1900s, levees constructed at the southern end of Tomales Bay for roads and dairy farms have served to hydrologically disconnect Lagunitas Creek and its tributaries from their floodplains. As a result, wetland conditions within the Waldo Giacomini Ranch and Olema Marsh (Project Area) have been degraded, and hydrologic and ecological functionality of what was once of the largest integrated tidal marsh complexes in Tomales Bay has been substantially reduced. Natural wetlands provide many important functions for humans and wildlife, including floodwater retention, water quality improvement, wildlife habitat, and recreational opportunities. Because two-thirds of the Bay's freshwater inflow passes through the Project Area, these wetlands may have once played an integral role in maintaining health of Tomales Bay, which has deteriorated over the last century because of excessive sedimentation, water and sediment quality problems, non-native species invasions, and other issues.

In 2000, the Park Service acquired the Waldo Giacomini Ranch for the purpose of wetland restoration using a combination of Congressional appropriations and mitigation monies from the California Department of Transportation (CalTrans). Because the Project Area is in the northern district of the Golden Gate National Recreation Area (GGNRA), it is managed by Point Reyes National Seashore (Seashore). The Seashore is the lead agency under the National Environmental Policy Act (NEPA), and the California State Lands Commission (CSLC), which owns the portion of Lagunitas Creek within the Project Area, is the lead agency under the California Environmental Quality Act (CEQA).

This *Final Environmental Impact Statement/Environmental Impact Report* (FEIS/EIR) evaluates four alternatives for restoring wetlands and wetland functionality and incorporating public access opportunities that do not impact wetland function, as well as the No Action Alternative (e.g. closure of the dairy and discontinuation of intensive agricultural management). The primary purpose and objectives of the proposed project include: restoring hydrologic and ecological processes and functions in a significant portion of the Project Area; emphasizing actions that would benefit the health of the entire Tomales Bay watershed and not just the Project Area; and incorporating opportunities for experiencing and enjoying the restored wetlands that do not conflict with the project's purpose.

The *Draft Environmental Impact Statement/Environmental Impact Report* (DEIS/EIR) was circulated for public review and comment for approximately 60 days, with the public comment period ending February 14, 2007. Responses to comments submitted to the Park Service and CSLC by agencies, organizations, and individuals during the public comment period are included in Chapter 5. Where necessary, additional information has been added to Chapters 2 (Alternatives), 3 (Affected Environment) and 4 (Environmental Consequences and Mitigation Measures) of the FEIS/EIR to improve description of alternatives and analyses of potential impacts and address specific public comments. Based on agency and public comment, the Park Service decided to select Alternative D rather than Alternative C as the lead agencies' preferred alternative in the FEIS/EIR. Alternative D is the lead agencies' preferred alternative, because it best meets the purpose of restoring wetlands while also meeting the agencies' objective of providing public access opportunities that allow visitors and residents to experience and enjoy the restored wetland. Alternative D is also the environmentally preferred alternative, because it provides the most restoration. Alternative D has been slightly modified to improve restoration potential and access opportunities, without causing more than a negligible change in the level of impacts.

The Record of Decision adopting the alternative or actions constituting the approved plan will be prepared not sooner than 30 days after the publication in the Federal Register of the Environmental Protection Agency's notice of filing of the FEIS/EIR. The complete FEIS/EIR will be posted on the Seashore's website at http://www.nps.gov/pore, and the printed document and digital version on compact disc will also be available for viewing at the park headquarters and local libraries. For further information on the FEIS/EIR, please check this website or contact Seashore headquarters at the telephone number below.

Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956
Telephone: (415) 464-5100 | Facsimile: (415) 663-8132

Intentionally Left Blank

Executive Summary

Introduction

This Final *Environmental Impact Statement/Environmental Impact Report (FEIS/EIR)* has been prepared to assist the public, the National Park Service (Park Service), and the California State Lands Commission (CSLC) in formulating a wetlands restoration plan for the Waldo Giacomini Ranch (Giacomini Ranch) and Olema Marsh. Together, the 550-acre Giacomini Ranch and 63-acre Olema Marsh represent the Project Area for the Giacomini Wetland Restoration Project (proposed project).

Since early 1900s, levees constructed at the southern end of Tomales Bay for roads and dairy farms have served to hydrologically disconnect Lagunitas Creek and its tributaries from their floodplains. Infrastructure such as levees, tidegates, and culverts, as well as intensive agricultural management, has degraded the condition of these wetlands and substantially reduced hydrologic and ecological functionality of what was once of the largest integrated tidal marsh complexes in Tomales Bay. Hydrologically connected, natural wetlands provide many important functions and services for humans and wildlife, including floodwater retention, water quality improvement, wildlife habitat and food supply, recreational opportunities, and support of mariculture and fisheries industries. As two-thirds of Tomales Bay's freshwater inflow passes through the Project Area, these wetlands probably once played an integral role in maintaining health of Tomales Bay, which has deteriorated over the last century because of excessive sedimentation, water and sediment quality problems, non-native species invasions, and other issues.

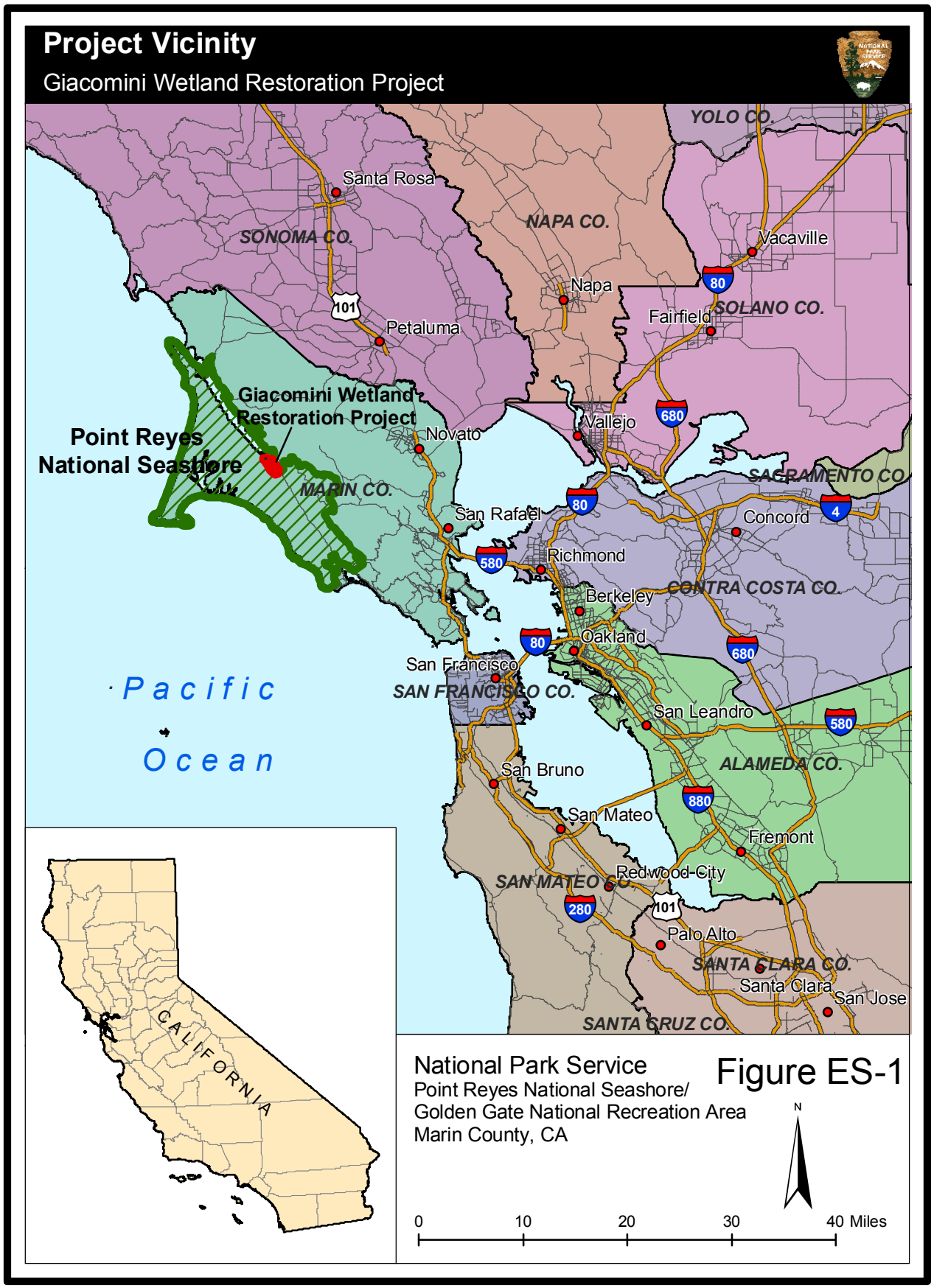
The proposed project would restore natural hydrologic processes to a significant portion of the Project Area, thereby promoting restoration of ecological processes and functions. By removing levees, tidegates, and culverts, floodwaters of Lagunitas and other Project Area creeks that carry sediment, nutrients, and other pollutants would be able to flood onto historic floodplains to be filtered and transformed by the restored wetlands. This hydrologic reconnection would be expected to decrease flooding within the local community and improve water quality within the Project Area and Tomales Bay. In addition, it would increase habitat and food resources for wildlife within the watershed and would provide opportunities for public enjoyment and education through inclusion of public access trails, viewing overlooks and platforms, and interpretative exhibits.

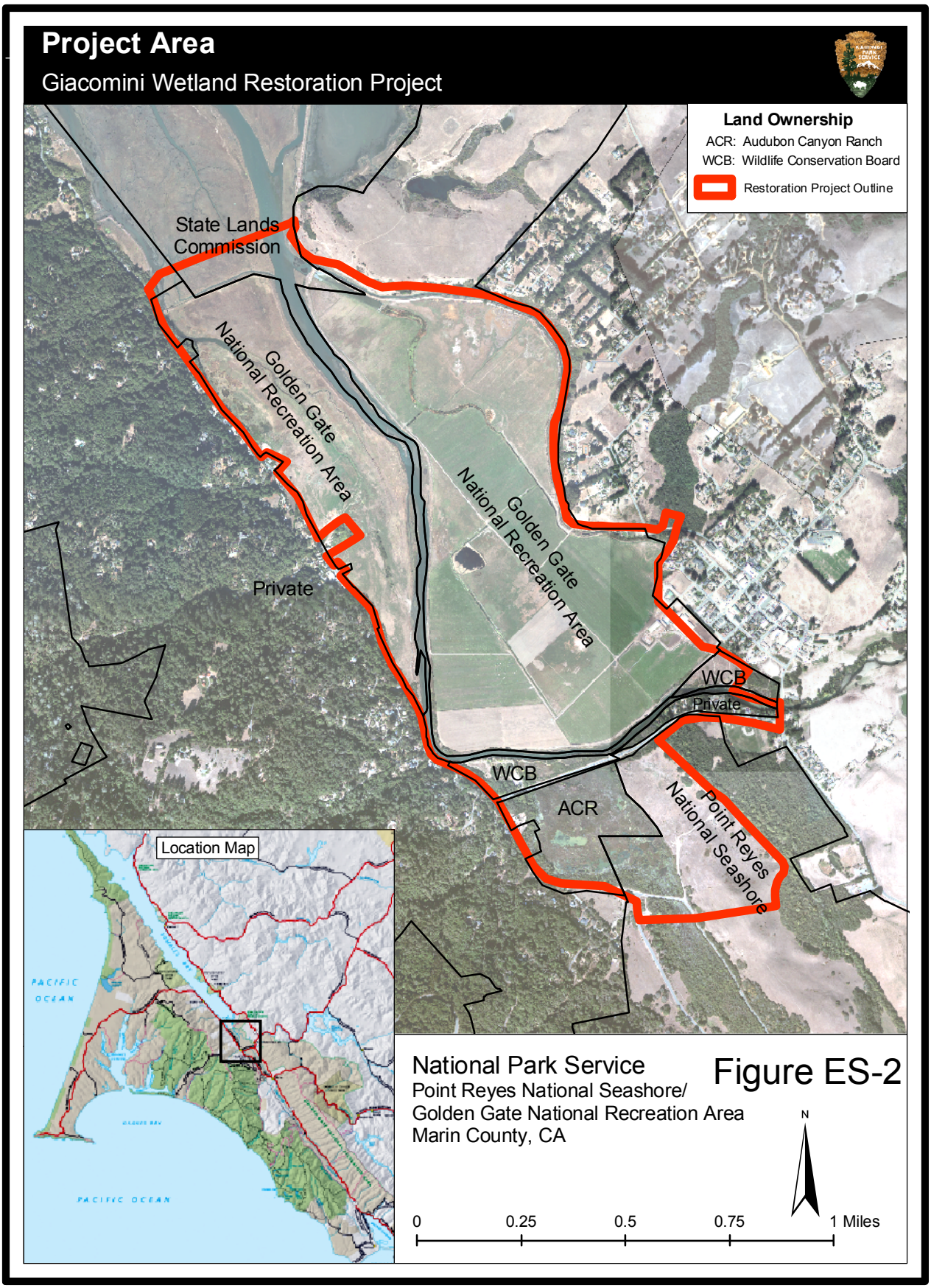
The Park Service is acting as the lead NEPA agency and principal project proponent and manager. The Park Service owns the Giacomini Ranch (ES Figures 1 and 2). A portion of Lagunitas Creek and some tidal lands are owned and managed by the CSLC, who is the lead agency under the California Environmental Quality Act (CEQA). The Park Service also owns a small portion of Olema Marsh; the other portion is owned by the non-profit organization, Audubon Canyon Ranch (ACR), which is actively working with the Park Service and CSLC on the proposed project.

Need for Action

More Than 50 Percent of Wetlands in Tomales Bay Lost or Degraded

Excessive sedimentation in the Tomales Bay watershed during the late 1800s from logging and agricultural development resulted in large-scale conversion of open water and mudflats to vegetated marsh, nearly doubling vegetated wetland acreage in the bay. However, many of Tomales Bay's tidal marshes were subsequently filled or hydrologically disconnected from creeks and the bay by construction of levees or earthen berms for roads,


Project Vicinity
Giacomini Wetland Restoration Project
YOLO CO.
Santa Rosa
SONOMA CO.
NAPA CO.
Vacaville
Napa
SOLANO CO.
Fairfield
Petaluma
Giacomini Wetland Restoration Project
Point Reyes National Seashore
Vallejo
Novato
SACRAMENTO CO.
MARIN CO.
San Rafael
Concord
Richmond
CONTRA COSTA CO.
Berkeley
Oakland
San Francisco
SAN FRANCISCO CO.
Pacific Ocean
San Leandro
ALAMEDA CO.
San Bruno
San Mateo
Fremont
Redwood City
SAN MATEO CO.
Palo Alto
SANTA CLARA CO.
Santa Clara
San Jose
SANTA CRUZ CO.
CALIFORNIA
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
Figure ES-1
N
0 10 20 30 40 Miles


Project Area
Giacomini Wetland Restoration Project
Land Ownership
ACR: Audubon Canyon Ranch
WCB: Wildlife Conservation Board
Restoration Project Outline
State Lands Commission
Golden Gate National Recreation Area
Golden Gate National Recreation Area
Private
WCB
Private
WCB
ACR
Point Reyes National Seashore
Location Map
PACIFIC OCEAN
PACIFIC OCEAN
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
Figure ES-2
N
0
0.25
0.5
0.75
1 Miles

railroads, livestock ponds, and duck clubs. This trend mirrors that of other areas in California and the United States, where average losses of wetlands have ranged from approximately 50- to 90 percent (Dahl 1990).

The largest loss of hydrologically connected wetlands in Tomales Bay came with diking of approximately 550 acres for operation of the Waldo Giacomini dairy ranch and pastures in 1946. A portion of this wetland complex had already been lost around the turn of the 20th century, when a levee was constructed across the mouth of Bear Valley and Olema Creeks for a road.

Since then, the Project Area has been subjected to numerous alterations for maintenance and operations purposes. Levees on Lagunitas Creek within the Giacomini Ranch have been reinforced through rip-rapping. Tomasini Creek, which once flowed through the East Pasture, has been moved and leveed to run adjacent to the Point Reyes Mesa, while Bear Valley Creek has been realigned to run along the eastern perimeter of Olema Marsh. Tides have been excluded by tidegates and other structures. Upstream Lagunitas Creek waters have been pumped to the Giacomini Ranch to irrigate pastures. Former tidal creeks have been straightened and new channels, dug to serve as ditches for irrigation waters, with ditches frequently maintained through dredging. Wetlands have been filled, leveled, and, in the case of the Giacomini Ranch, subject to varying degrees of manure spreading. Vegetation has been altered through removal of riparian vegetation, as well as introduction of non-native herbs and forbs to increase forage for approximately 500-800 head of grazing dairy cattle. In some cases, lack of maintenance can be the problem in highly altered systems such as Olema Marsh, as attested to by steadily increasing water levels during recent years within the marsh from lack of culvert maintenance.

Wetlands Serve Important Functions for Humans and Wildlife

Wetlands play an important role in the health of aquatic and terrestrial ecosystems. They provide valuable functions for humans and wildlife such as storing floodwaters, dissipating energy of flood flows, improving water quality, providing habitat and food for wildlife, as well as providing recreational opportunities and support of mariculture and fisheries industries. Loss or degradation of wetlands eliminate or substantially reduce the potential for wetlands to serve some of these important functions.

Within the Project Area, levees have dramatically reduced floodwater retention in floodplains of Lagunitas Creek and Tomasini Creek, with levees along Lagunitas Creek potentially exacerbating flooding of adjacent private properties. Removal of riparian vegetation on levees has also decreased the ability of riparian systems to dissipate the energy of flood flows, leading to faster, more turbulent, and erosive flows. In Olema Marsh, steadily increasing water surface levels created by poor drainage of Bear Valley Creek flows have not only reduced the potential volume of floodwater that can be stored, but threaten to increase flooding of adjacent county roadways such as Levee Road and Bear Valley Road.

While the Giacomini Ranch and Olema Marsh are still largely wetland and home to at least two federally listed threatened or endangered species, their value to the larger Lagunitas Creek and Tomales Bay ecosystems has been greatly diminished by land degradation and the lack of hydrologic connectivity. Wetlands on the Giacomini Ranch largely consist of monotypic expanses of wet pasturelands created through seeding of non-native grasses and herbs and lack the structural habitat diversity so important to wildlife. The conversion of Olema Marsh to freshwater marsh through diking has ostensibly increased its attractiveness to some wildlife species, such as waterbirds, but it likely has also displaced species that could have historically occurred in the transitional zone between fresh and salt water, such as the federally listed endangered species, tidewater goby (*Eucyclogobius newberryi*).

Tomales Bay Degraded by Pollution and Other Impacts

The issue of wetland and floodplain functionality could prove particularly important in Tomales Bay. Historically, the Bay has been viewed as a pristine estuary and even used as a reference site in ecological studies. However, the largely rural nature of this watershed has not rendered it immune to impact from human uses, including failing septic systems, agriculture, mercury mining, landfill operations, and oil spills. Beaches and swimming areas within the Bay and adjacent areas sometimes must be closed due to poor water quality conditions. During the last decade, poor water quality has forced one of the bay's leading industries, oyster fisheries, to close down several times and, in the late 1990s, was associated with a virus outbreak in people eating oysters from Tomales Bay. Mercury mining in the Tomales Bay watershed during the late 1960s-1970s caused deposition of mercury-contaminated sediment into the Bay and continues to threaten commercially and recreationally important fisheries.

The failure of Tomales Bay to consistently meet water quality standards for designated beneficial uses such as oyster mariculture and public recreation and wildlife needs prompted the San Francisco District of the Regional Water Quality Control Board (RWQCB) to designate the bay and some of its subwatersheds as impaired for sediment, nutrients, pathogens, and mercury under Section 303(d) of the Clean Water Act. The RWQCB is in the process of finalizing or developing several new water quality standards for Tomales Bay through the Total Maximum Daily Load (TMDL) process, which sets maximum limits of loading to designated water bodies for pollutants of concern such as sediment, nutrients, pathogens, and mercury.

Water quality problems threaten not only the oyster fisheries and humans using the Bay for recreational purposes, but the freshwater, estuarine, and marine wildlife species that use Tomales Bay for breeding or foraging habitat. Because of its importance to wildlife, Tomales Bay is not only part of the Golden Gate Biosphere Reserve and a California Critical Coastal Area, but in 2002, it was nominated as a "Wetland of International Importance" under an international treaty called the Convention on Wetlands (commonly known as the Ramsar Convention). Tomales Bay is also one of 16 wetland areas that qualify for inclusion as a wetland of regional importance under the Western Hemisphere Shorebird Reserve Network because of its large number of wintering and migrating shorebirds (Kelly 2001).

Restoring Wetlands Can Improve Health of Bay

Wetland functionality can be restored or improved through restoration of degraded wetlands. The number and quality of functions performed by wetlands can be increased considerably by removing sources of pollution, discontinuing harmful management activities, and eliminating or reducing constraints on natural hydrologic processes, which are key to many of the important functions played by wetlands. Natural hydrologic processes include marine-influenced tidal action with the daily ebb and flood of tides and fluvial or creek action, which encompasses the seasonal cycle of freshwater flow, as well as overbank flooding onto floodplains and movement of the creek channel during storm events.

In addition to improving conditions within individual wetlands, restoring or improving functionality may also improve the health of the overall ecosystem. Within the Project Area, restoration of natural hydrologic processes through removal or replacement of levees, tidegates, and culverts and increased connectivity with historic floodplains would potentially reduce flooding within the local community by increasing the amount of floodplain available for storage or conveyance of floodwaters. Increased connectivity of floodwaters with floodplains could also improve water quality, because floodwaters carry sediments, nutrients, pathogens, and contaminants that could now be deposited onto floodplains rather than transported downstream to Tomales Bay. The potential value of the Project Area to improvement in downstream water quality is underscored by the fact that two-thirds of water flowing into the Bay comes from Lagunitas Creek (Fischer et al. 1996), which is currently leveed to run through the middle of the Giacomini Ranch. Restoring these wetlands would not only benefit flooding and water quality, but would increase habitat and food resources for wildlife within the Project Area and the entire Tomales Bay watershed.

The potential importance to the health of Tomales Bay and the outer Marin coastline of restoring hydrologic connectivity between the Giacomini Ranch, Olema Marsh, and Tomales Bay is underscored by the relative scarcity of coastal wetlands present along the central California coastline. Giacomini Ranch and Olema Marsh account for as much as 12 percent of the historic wetlands present along the outer central California coast and as much as 1 percent of wetlands along the entire outer California coastline. The relative scarcity of coastal wetlands present within this watershed and the surrounding California coastline increases their importance and the impact of losses that have occurred.

Purpose of Project

Background

A large portion of Tomales Bay watershed lands were acquired by the Park Service in the 1960s and 1970s for establishment of two neighboring parks -- Point Reyes National Seashore (Seashore) and Golden Gate National Recreation Area (GGNRA). The Giacomini Ranch was not among lands acquired, but in 1980, the boundary for GGNRA was expanded to include the Giacomini Ranch and the eastern portion of Tomales Bay. This boundary expansion enabled the GGNRA to acquire lands in these areas when funds and willing owners became available. After several decades of discussion with the Giacomini family, the ranch was eventually acquired in February 2000 with a combination of Congressional appropriations and state monies. State

funding was secured from the California Department of Transportation (CalTrans), which transferred funds to the Park Service for purchase, planning, and implementation of a restoration project in exchange for the Park Service assuming wetland mitigation obligations for impacts associated with a road repair in the coastal portion of Marin County. While the Park Service is required under its agreement with CalTrans and regulatory agencies to mitigate only a small amount of wetlands, the Memorandum of Understanding called for restoration of a "significant portion" of the Giacomini Ranch.

Purpose, Objectives, and Constraints

Purpose

The purpose of the proposed project is to restore natural hydrologic processes within a significant portion of the Project Area, thereby promoting restoration of ecological processes and functions.

Objectives

In addition to the primary purpose, the Park Service and the CSLC have identified three objectives that either define the purpose more clearly or identify other "purposes" that are considered desirable. The three objectives are:

- Restore natural, self-sustaining tidal, fluvial (streamflow), and groundwater hydrologic processes in a significant portion of the Project Area, thereby enabling reestablishment of some of the ecological processes and functions associated with wetland and riparian areas, such as water quality improvement, floodwater storage, food chain support, and wildlife habitat.
- Pursue a watershed-based approach to restoration in that restoration planning for the Project Area will emphasize opportunities to improve ecological conditions within the entire Tomales Bay watershed, not just in the Project Area itself.
- To the extent possible, incorporate opportunities for the public to experience and enjoy the restoration process as long as opportunities do not conflict with the project's purpose or with Park Service, CSLC, or other agency legislation or policies.

Constraints

In developing alternatives, many factors can act to constrain development or implementation of alternatives. These include legal, regulatory, and logistic and technical constraints. Many of these constraints are evaluated as subject topics under impact analysis, but certain critical constraints warranted additional consideration. These constraints include:

- *Flood risks to adjacent private residences and public roads would not be increased above current levels.* The Giacomini Ranch and adjoining private residential and county road areas fall within the 100-year floodplain and experience substantial flooding even during 10-year events. Federal guidelines for floodplain management direct federal agencies to reduce the risk of flood loss and to minimize the impact of floods on human safety, health and welfare, as well as to restore and preserve the natural and beneficial values served by floodplains.
- Saltwater intrusion conditions into groundwater wells in Point Reyes Station would not exceed current levels, or any increase caused by the proposed project would be mitigated by the project proponents. North Marin Water District (NMWD) operates a municipal groundwater well for the town of Point Reyes Station in an alluvial aquifer directly north of the Project Area. During the summer, when demand is highest, NMWD has experienced salinity intrusion into its groundwater wells. NMWD has expressed concerns regarding the potential for increased salinity intrusion with removal of the levees and restoration of the Ranch to tidal wetlands.
- Impacts to the amount of breeding habitat for the tidewater goby and California red-legged frog would be minimized to the extent practicable. Existing habitat would not necessarily be managed in situ or in current locations, but rather would be allowed to develop elsewhere in response to changes in the hydrologic regime and boundary between salt- and freshwaters following implementation of restoration: The federally-endangered tidewater goby and federally-threatened California red-legged frog occur in the Project Area. These brackish and freshwater species may

have either established or increased in numbers relative to historic conditions within the Project Area due to diking and impoundment of freshwater. The Park Service mandates parks to protect and to strive to recover all species that are listed under the Endangered Species Act and to manage designated critical and essential habitats (NPS 2006; Section 4.4.2.3). However, habitat requirements of these species conflict with those of other target species and with the nature of the landscape being restored.

Alternatives

NEPA and CEQA require project proponents to identify a range of reasonable project or action alternatives within an EIS/EIR. Reasonable action alternatives must be economically and technically feasible and demonstrate common sense. With the exception of the No Action alternative, alternatives must meet, to a large degree, stated purpose, goals, and objectives for taking action and not be in conflict with federal, Park Service, state, and local laws, regulations, and policies or constraints identified during scoping. A No Action – or No Project -- alternative must be analyzed under NEPA and CEQA: this alternative evaluates future conditions under existing management plans or agreements and allows the public to evaluate the implications of what would happen if the proposed project was not implemented.

As part of the alternative development process, at least eight full-scale alternatives, as well as smaller-scale design variations of restoration and public access components, were considered. Of these eight alternatives, five are fully analyzed in this document. The other three were considered, but rejected because they would not adequately meet the project's purpose and objectives or were considered too similar in scope or duplicative to other existing alternatives. These alternatives and some of the more substantial variations to existing alternative design assessed are briefly discussed in the section, "Alternatives Considered, But Not Analyzed Further," in Chapter 2 of the document.

The following five alternatives have been developed for the Giacomini Wetland Restoration Project FEIS/EIR:

- ***No Action Alternative, including Actions Common to All Alternatives*** – Management of Project Area as Specified Under Current Management Plan and Existing Agreements, Including Mitigation as Required by Existing Mitigation Agreement and Maintenance of Existing Public Access Facilities
- ***Alternative A*** – Limited Restoration of the Giacomini Ranch East Pasture with Expanded Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter
- ***Alternative B*** – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter
- ***Alternative C*** – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access
- ***Alternative D (Agency Preferred and Environmentally Preferred Alternative)*** – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access

Action alternatives generally range from the least (Alternative A) to the greatest amount of restoration (Alternative D) and build upon each other such that restoration components or elements from Alternative A are generally (but not always) carried forward to Alternative B and often expanded. The No Action Alternative involves a small mitigation/restoration component that would satisfy the Park Service's obligation to CalTrans and the CCC. Under Alternatives C - D, restoration efforts are expanded to include Olema Marsh. For the public access component, the extent of constructed infrastructure is highest under Alternatives A and B and decreases under Alternatives C and D, such that the least extent of constructed infrastructure occurs in Alternative D. There would be no change to public access under the No Action Alternative.

No Action Alternative, including Actions Common to All Alternatives

Under the No Action Alternative (ES Figure 3), levees, tidegates, and culverts in the Giacomini Ranch would remain. An 11-acre area would be restored on the northeast corner of the east pasture to satisfy mitigation

requirements under an existing Park Service agreement with CalTrans. The remainder of the levees in the East Pasture and West Pasture would remain, although there would be no levee or other agricultural maintenance. Under the No Action Alternative only, there is potential for limited grazing, with consultation conducted under a separate compliance process. Olema Marsh would not be restored, and there would be no new public access facilities: existing facilities would be retained (ES Figure 4).

Management Actions Common to All Alternatives

All of the alternatives have several management actions in common that will be performed in concurrence with existing agreements or the existing General Management Plan for the Seashore and north district of the GGNRA. These include:

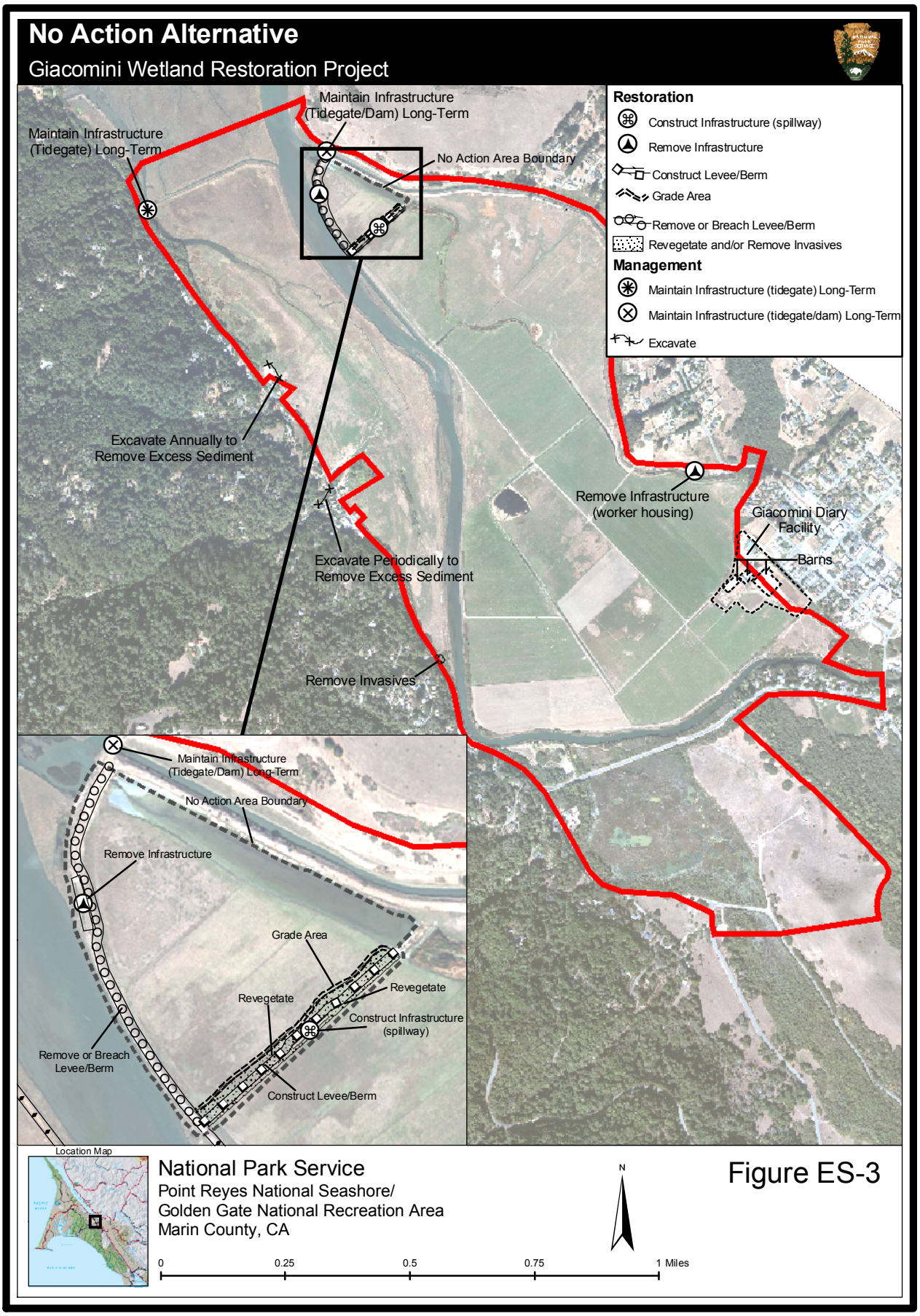
- No Agricultural Land Management
- Removal of Main Dairy structures from Upland Areas
- Removal of High Priority Invasive Plant Species
- Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses
- Recover the Tomales Bay Tidewater Goby Population
- Leasing of the Subtidal Portion of Lagunitas Creek in the Project Area from CSLC
- Minimal Maintenance and Maintenance of Existing Property Access Points
- Maintenance Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture
- Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek

Restoration and Management Actions Specific to the No Action Alternative

- Mitigation Requirements Completed through Wetland Restoration in East Pasture
- No Dairy Operation or Agricultural Land Management, Except for Leased Grazing Contingent upon Separate Public Review
- Tidegates and Levees Retained, But Generally Not Maintained
- Existing Public Access Maintained Along Informal Paths
- No ADA-compliant access

Construction

- Construction would occur during one construction year and would only involve mitigation actions required under Park Service's agreement with CalTrans.
- Construction would result in excavation of approximately 3,800 cubic yards of soil and 120 cubic yards of concrete, pipe, and other non-soil materials.
- More than two-thirds of excavated material would be re-used to construct new levee and high marsh habitat (~2,900 cubic yards).
- Approximately 880 cubic yards of soil would be hauled to an abandoned quarry in the Tomales Point portion of the Seashore. Non-soil materials and demolition debris would be recycled or disposed of off-site at a municipal landfill in Petaluma, California.
- Dump trucks hauling excavated materials would use local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, Levee Road, Pierce Point Road, and state highways such as State Route 1.


No Action Alternative
Giacomini Wetland Restoration Project
Restoration
Construct Infrastructure (spillway)
Remove Infrastructure
Construct Levee/Berm
Grade Area
Remove or Breach Levee/Berm
Revegetate and/or Remove Invasives
Management
Maintain Infrastructure (tidegate) Long-Term
Maintain Infrastructure (tidegate/dam) Long-Term
Excavate
Maintain Infrastructure (Tidegate/Dam) Long-Term
Maintain Infrastructure (Tidegate) Long-Term
No Action Area Boundary
Excavate Annually to Remove Excess Sediment
Excavate Periodically to Remove Excess Sediment
Remove Invasives
Remove Infrastructure (worker housing)
Giacomini Diary Facility
Barns
Maintain Infrastructure (Tidegate/Dam) Long-Term
No Action Area Boundary
Remove Infrastructure
Grade Area
Revegetate
Revegetate
Construct Infrastructure (spillway)
Remove or Breach Levee/Berm
Construct Levee/Berm
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure ES-3

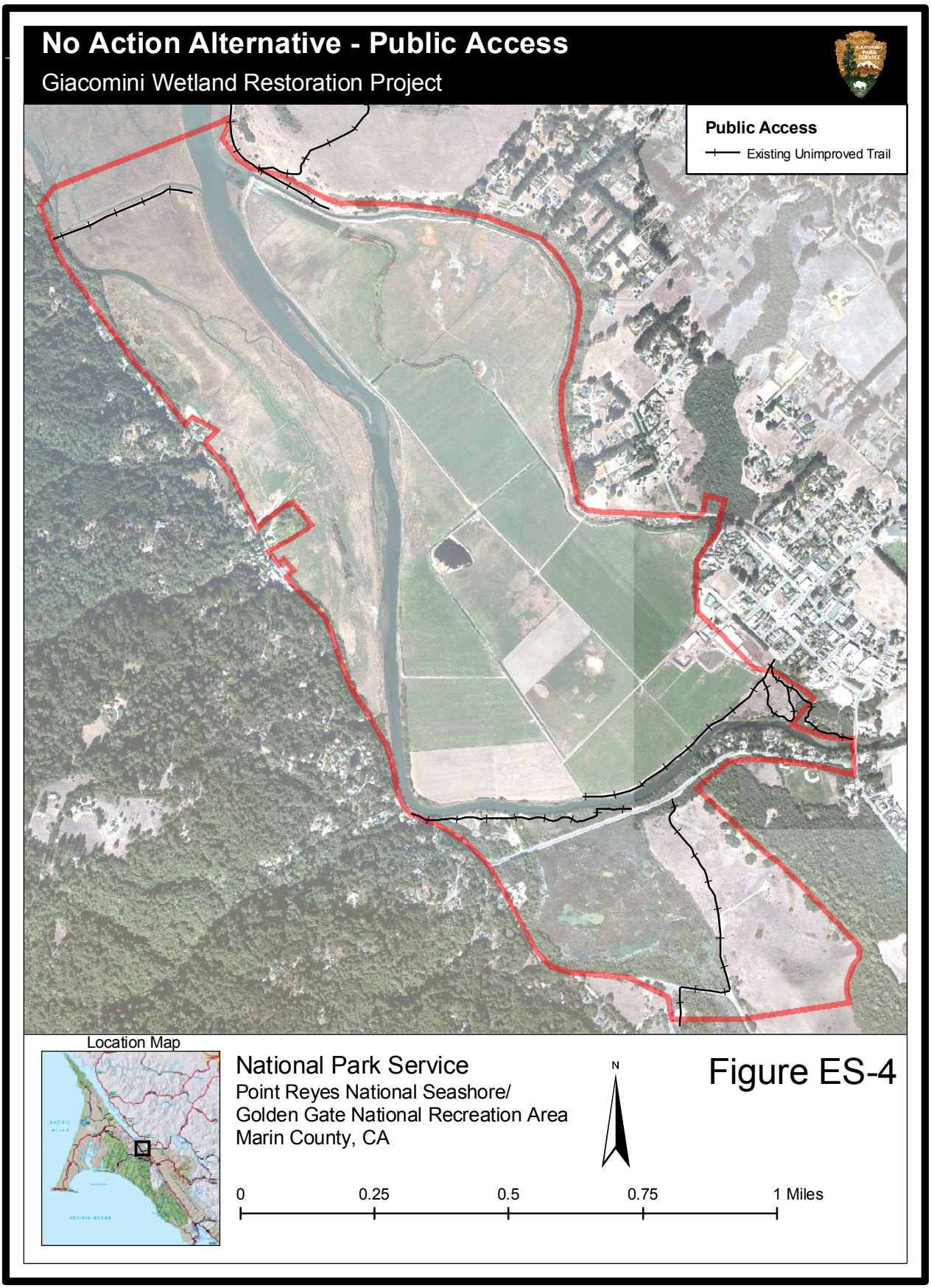

No Action Alternative - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure ES-4

Alternative A – Limited Restoration of the Giacomini Ranch East Pasture Only with Expanded Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter

Alternative A (ES Figure 5) would involve selective breaching of the East Pasture levee, while levees and tidegates in the West Pasture would not be removed. A limited amount of tidal channel creation, creek bank grading, and revegetation would also be performed in the East Pasture. Restoration actions in Alternative A encompass actions common to all Action Alternatives and are carried forward into Alternatives B-D. Most of the actions under this alternative focus on removal agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways, as well as removal of ranch buildings.

As part of the public access, the southern perimeter trail would include a prefabricated bridge across Lagunitas Creek, near the old summer dam location across from White House Pool County Park (ES Figure 6). The bridge design would place footings outside of the active channel, thereby reducing effects on hydrologic processes. Future extension of the southern perimeter trail, in collaboration with the County of Marin, would connect White House Pool County Park with a path along Sir Francis Drake that would either run alongside Sir Francis Drake Boulevard or move off the road at the southern end of the unrestored West Pasture onto a low-elevation boardwalk that would join back with Sir Francis Drake Boulevard in Inverness Park. The other infrastructure that would be constructed under Alternative A would be a culverted berm through- trail on the eastern perimeter of the East Pasture (ES Figure 6).

Restoration – East Pasture

- Removal of Agricultural Infrastructure
- Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds
- Limited Breaching of Levee in Southern and Northern Portions of East Pasture
- Lagunitas Creek Bank Graded to More Stable Profile and Revegetated
- Deepening of Historic Slough and Creation of New Tidal Channels
- Removal of Invasive Plant Species
- Revegetation in East Pasture

Restoration – West Pasture

- There would be no restoration conducted in the West Pasture other than the removal of high priority invasive species described under the No Action Alternative.

Restoration – Olema Marsh

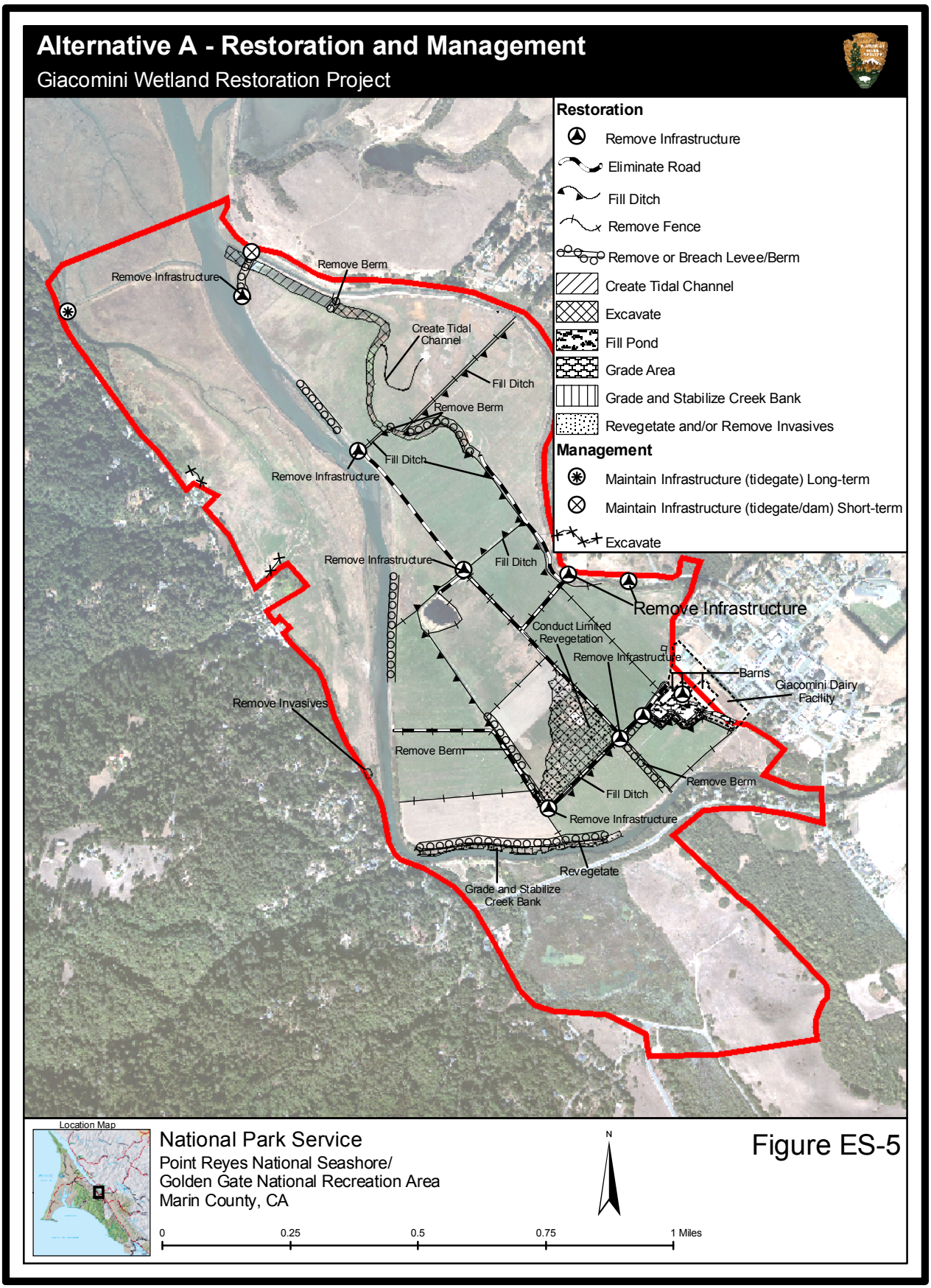
- There would be no restoration conducted in Olema Marsh.

Management

- Same as described under Actions Common to All Alternatives under the No Action Alternative.

Public Access

- Creation of Southern Perimeter Through-Trail from Point Reyes Station to existing White House Pool County park via a Permanent Pedestrian/Bike bridge near Location of Old Summer Dam and ADA-compliant trail to overlook on former dairy facility
- Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County


Alternative A - Restoration and Management
Giacomini Wetland Restoration Project
Restoration
Remove Infrastructure
Eliminate Road
Fill Ditch
Remove Fence
Remove or Breach Levee/Berm
Create Tidal Channel
Excavate
Fill Pond
Grade Area
Grade and Stabilize Creek Bank
Revegetate and/or Remove Invasives
Management
Maintain Infrastructure (tidegate) Long-term
Maintain Infrastructure (tidegate/dam) Short-term
Excavate
Remove Infrastructure
Remove Berm
Create Tidal Channel
Fill Ditch
Remove Berm
Fill Ditch
Remove Infrastructure
Remove Infrastructure
Fill Ditch
Remove Infrastructure
Conduct Limited Revegetation
Remove Infrastructure
Barns
Giacomini Dairy Facility
Remove Invasives
Remove Berm
Remove Berm
Fill Ditch
Remove Infrastructure
Revegetate
Grade and Stabilize Creek Bank
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure ES-5

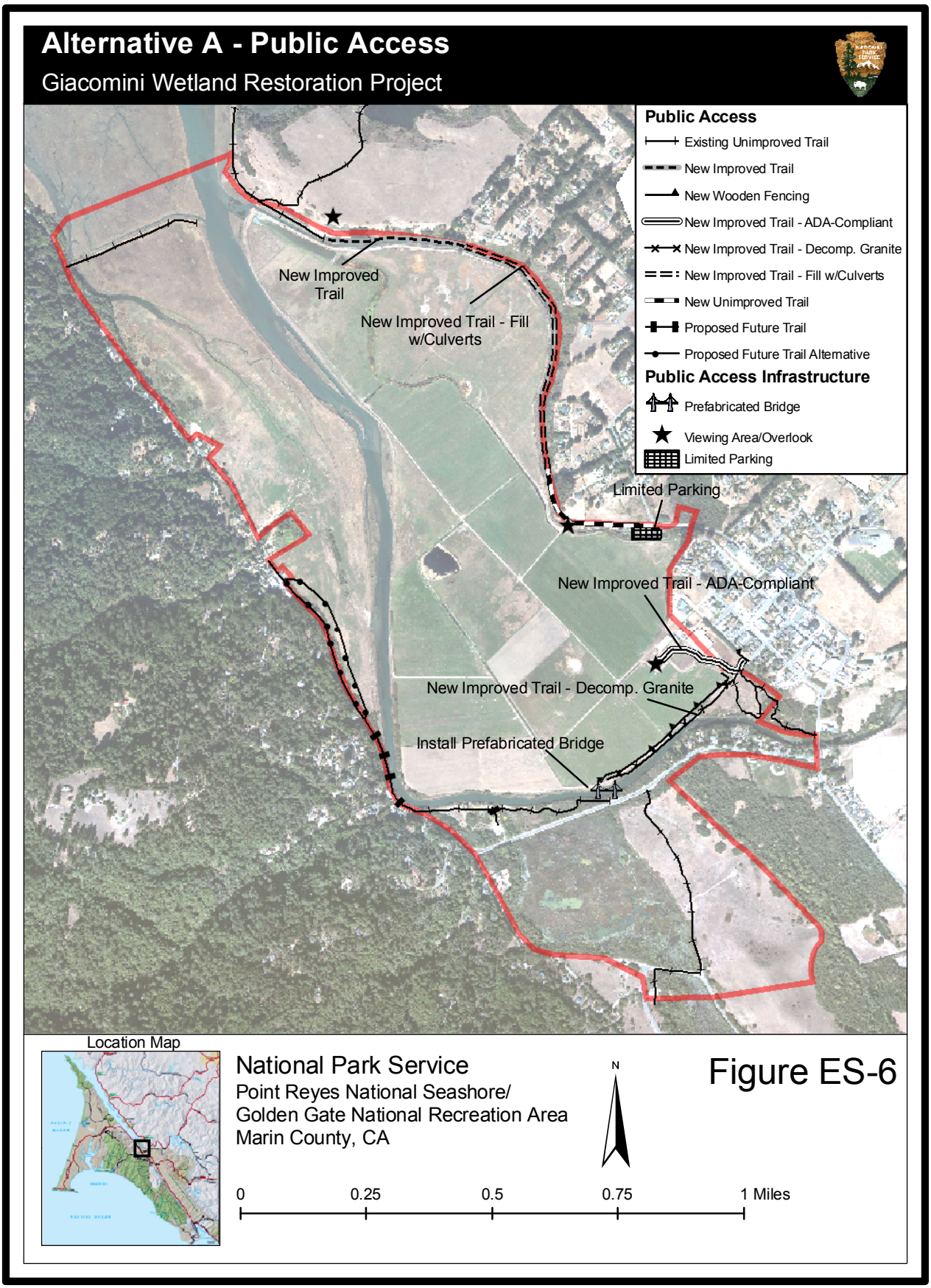

Alternative A - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Trail
New Wooden Fencing
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
New Improved Trail - Fill w/Culverts
New Unimproved Trail
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Prefabricated Bridge
Viewing Area/Overlook
Limited Parking
New Improved Trail
New Improved Trail - Fill w/Culverts
Limited Parking
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
Install Prefabricated Bridge
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure ES-6

- Creation of Eastern Perimeter Through-Trail Through Extension of Tomales Bay Trail from Railroad Point to Mesa Road via culverted berm trail
- Existing Public Access Maintained Along Informal Path on West Pasture north levee
- Construction of Viewing Areas, Overlooks, and Interpretative Exhibits

Construction

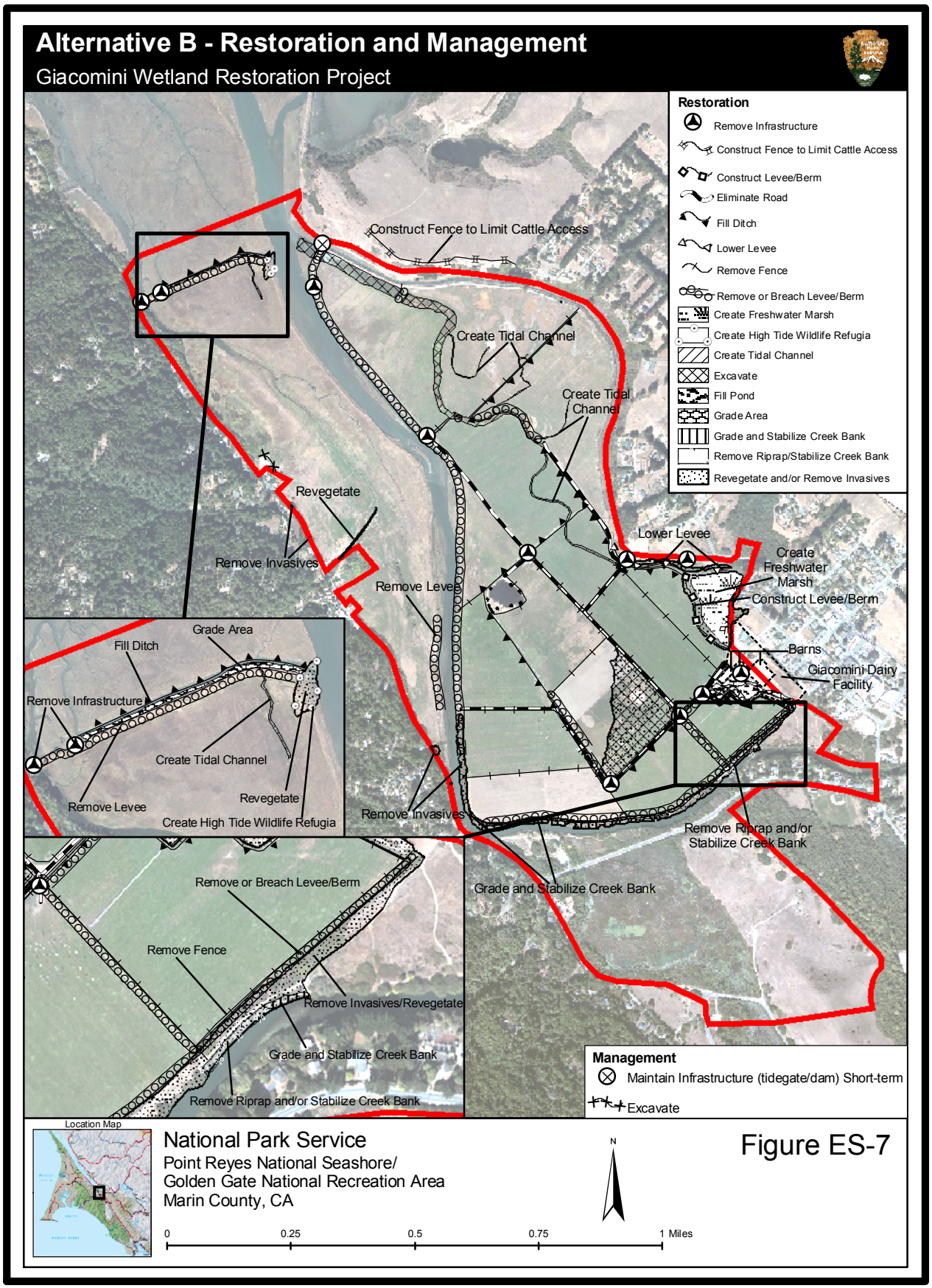
- Construction would occur only in the East Pasture. The restoration component would be constructed in two construction years or seasons. The public access component would be constructed over a period of one to two years during and/or after completion of restoration: the exact timing of construction is dependent on the Park Service and CSLC securing funding.
- Construction would result in excavation of approximately 87,000 cubic yards of soil and at least 680 cubic yards of concrete, pipe, and other non-soil materials and demolition debris.
- Approximately 40,775 cubic yards of fill would be re-used on-site. The other approximately 52,250 cubic yards of soil would be hauled to several abandoned quarries in the Tomales Point portion of the Seashore. Under this alternative, excavated sediment under this alternative would be used to restore the Grossi, Evans, and McClure DG. A separate document is being prepared by the Seashore detailing specific restoration plans for these quarries. Non-soil materials and demolition debris would either be recycled or hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.
- Dump trucks hauling excavated materials would use local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, Levee Road, Pierce Point Road, and state highways such as State Route 1. From Pierce Point Road, trucks would use existing unpaved roads to reach quarries. Traffic control may be required on Levee Road during installation of bridge.

Alternative B – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter

This alternative would completely remove the East Pasture levees and create several breaches in the West Pasture levee, as well as remove the tidegate on Fish Hatchery Creek (ES Figure 7). In general, this alternative builds upon the actions proposed in Alternative A by increasing tidal channel creation, grading, and revegetation. There would be no activities associated with the Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, including construction of the pedestrian access bridge across Lagunitas Creek near the old summer dam, and a planning area for the potential continuation of the southern perimeter trail to Inverness Park (ES Figure 8). The culverted-earthen fill portion of the eastern perimeter through-trail in Alternative A would be replaced with a boardwalk in Alternative B. On the West Pasture north levee, a viewing area would replace the existing informal trail.

Restoration – East Pasture

- Removal of Agricultural Infrastructure
- Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds
- Creek Bank Graded to More Stable Profile and Revegetated
- Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture
- Complete Removal of Levee in East Pasture
- Lowering of Tomasini Creek Berm
- Deepening of Historic Slough and Creation of New Tidal Channels
- Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle


Alternative B - Restoration and Management
Giacomini Wetland Restoration Project
Restoration
Remove Infrastructure
Construct Fence to Limit Cattle Access
Construct Levee/Berm
Eliminate Road
Fill Ditch
Lower Levee
Remove Fence
Remove or Breach Levee/Berm
Create Freshwater Marsh
Create High Tide Wildlife Refugia
Create Tidal Channel
Excavate
Fill Pond
Grade Area
Grade and Stabilize Creek Bank
Remove Riprap/Stabilize Creek Bank
Revegetate and/or Remove Invasives
Construct Fence to Limit Cattle Access
Create Tidal Channel
Create Tidal Channel
Revegetate
Remove Invasives
Remove Levee
Lower Levee
Create Freshwater Marsh
Construct Levee/Berm
Barns
Giacomini Dairy Facility
Grade Area
Fill Ditch
Remove Infrastructure
Create Tidal Channel
Remove Levee
Revegetate
Create High Tide Wildlife Refugia
Remove Invasives
Remove Riprap and/or Stabilize Creek Bank
Grade and Stabilize Creek Bank
Remove or Breach Levee/Berm
Remove Fence
Remove Invasives/Revegetate
Grade and Stabilize Creek Bank
Remove Riprap and/or Stabilize Creek Bank
Management
Maintain Infrastructure (tidegate/dam) Short-term
Excavate
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure ES-7

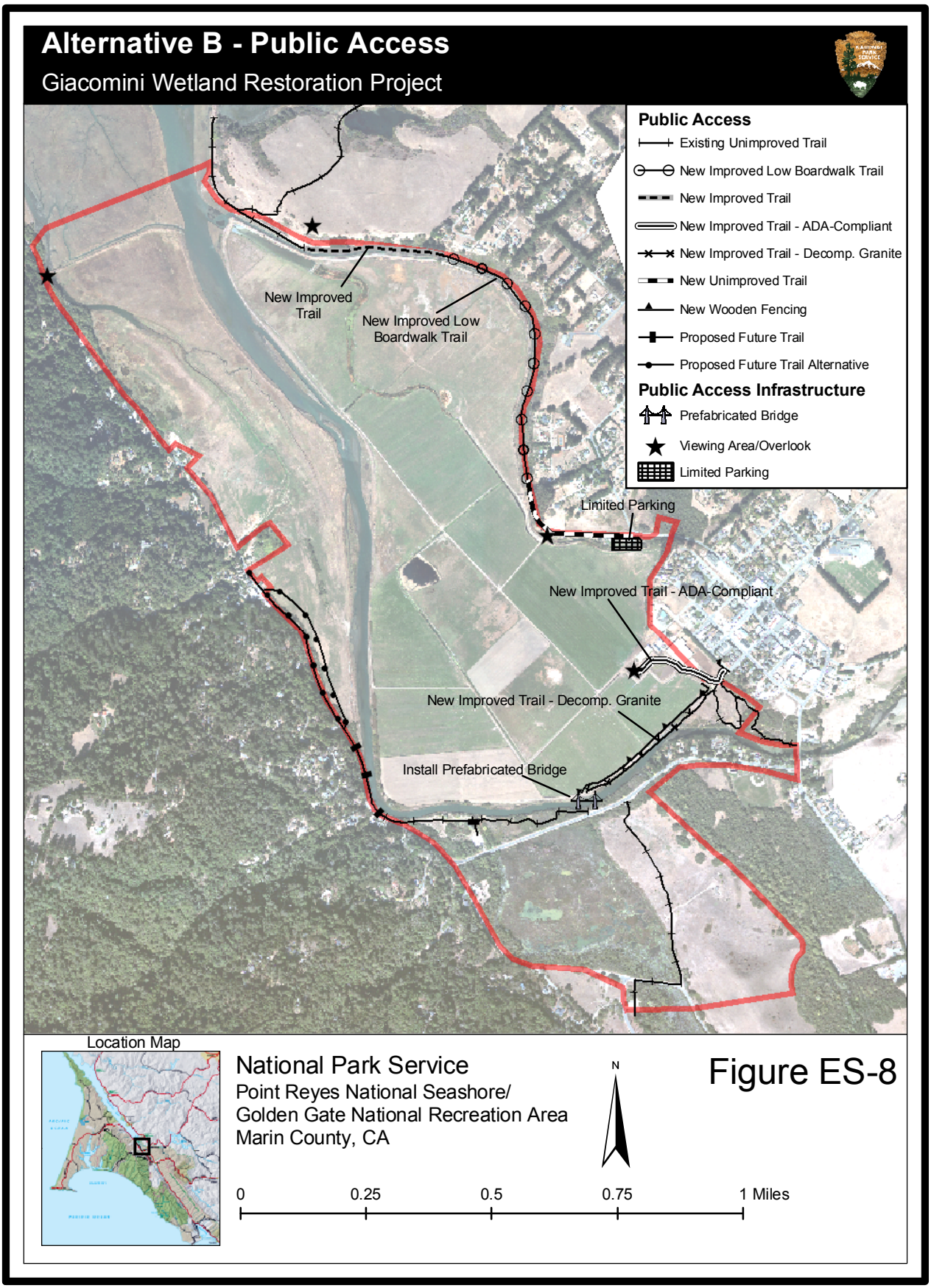

Alternative B - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Low Boardwalk Trail
New Improved Trail
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
New Unimproved Trail
New Wooden Fencing
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Prefabricated Bridge
Viewing Area/Overlook
Limited Parking
New Improved Trail
New Improved Low Boardwalk Trail
Limited Parking
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
Install Prefabricated Bridge
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure ES-8

- Installation of Fencing on Martinelli Ranch
- Removal of Invasive Plant Species
- Revegetation in East Pasture

Restoration – West Pasture

- Removal of Agricultural Infrastructure
- Limited Breaching of Levee in Southern and Northern Portions of West Pasture and Filling of Borrow Ditch
- Creation of New Tidal Channels
- Removal of Invasive Plant Species
- Revegetation in West Pasture

Restoration – Olema Marsh

- There would be no restoration conducted in Olema Marsh.

Management

- Same as described under Actions Common to All Alternatives under the No Action Alternative.

Public Access

- Creation of Southern Perimeter Through-Trail from Point Reyes Station to existing White House Pool County park via a Permanent Pedestrian/Bike Bridge near Location of Old Summer Dam and ADA-compliant trail to overlook on former dairy facility
- Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County
- Creation of Eastern Perimeter Through-Trail Through Extension of Tomales Bay Trail from Railroad Point to Mesa Road via low-elevation boardwalk
- Construction of Viewing Areas, Overlooks, and Interpretative Exhibits

Construction

- Construction would occur in the East and West Pastures of the Giacomini Ranch. The restoration component would be constructed over a period of two construction years or seasons. The public access component would be constructed over a period of one to two years during and/or after completion of restoration: the exact timing of construction is dependent on the Park Service and CSLC securing funding.
- Construction would result in excavation of approximately 145,000 cubic yards of soil and at least 850 cubic yards of concrete, pipe, other non-soil materials, demolition debris.
- Fill would involve re-use of approximately 72,500 cubic yards of excavated sediment on-site for restoration and public access components.
- Approximately 72,600 cubic yards of soil would be hauled to abandoned quarries in the Tomales Point portion of the Seashore. Excavated sediment under this alternative would be used to restore the Grossi, Evans, McClure DG, and Evans-Abbotts quarries under a separate project. Excavated non-soil materials would be recycled or disposed of off-site at a municipal landfill approximately 40 miles away in Petaluma, Calif.

- Dump trucks hauling excavated materials would use local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, Levee Road, Pierce Point Road, and state highways such as State Route 1. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, a pasture to reach quarries. Traffic control may be required on Levee Road during installation of bridge and on Sir Francis Drake Boulevard during equipment mobilization and hauling of excavated sediments.

Alternative C – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access

Alternative C involves complete removal of levees in both the West and East Pasture (ES Figure 9). In general, this alternative builds upon the actions proposed in Alternative B by increasing tidal channel creation, grading, and revegetation. In addition, the project boundary for this alternative has been expanded to include Olema Marsh, which is located south of the Giacomini Ranch and White House Pool and is owned by Audubon Canyon Ranch (ACR) and the Park Service. Olema Marsh and the Giacomini Ranch once formed an integrated tidal wetland complex. In Alternative C, there would be an adaptive restoration approach proposed for Olema Marsh that would include a phased approach to shallow channel excavation, vegetated berm removal, and potential replacement of Levee Road and Bear Valley Road culverts in the future should initial restoration efforts not achieve the desired degree of success. Public access components of Alternative C include the southern perimeter path and proposed future trails as described under Alternatives A and B, but there would be two spur trails rather than a through-trail on the eastern perimeter of the Giacomini Ranch (ES Figure 10).

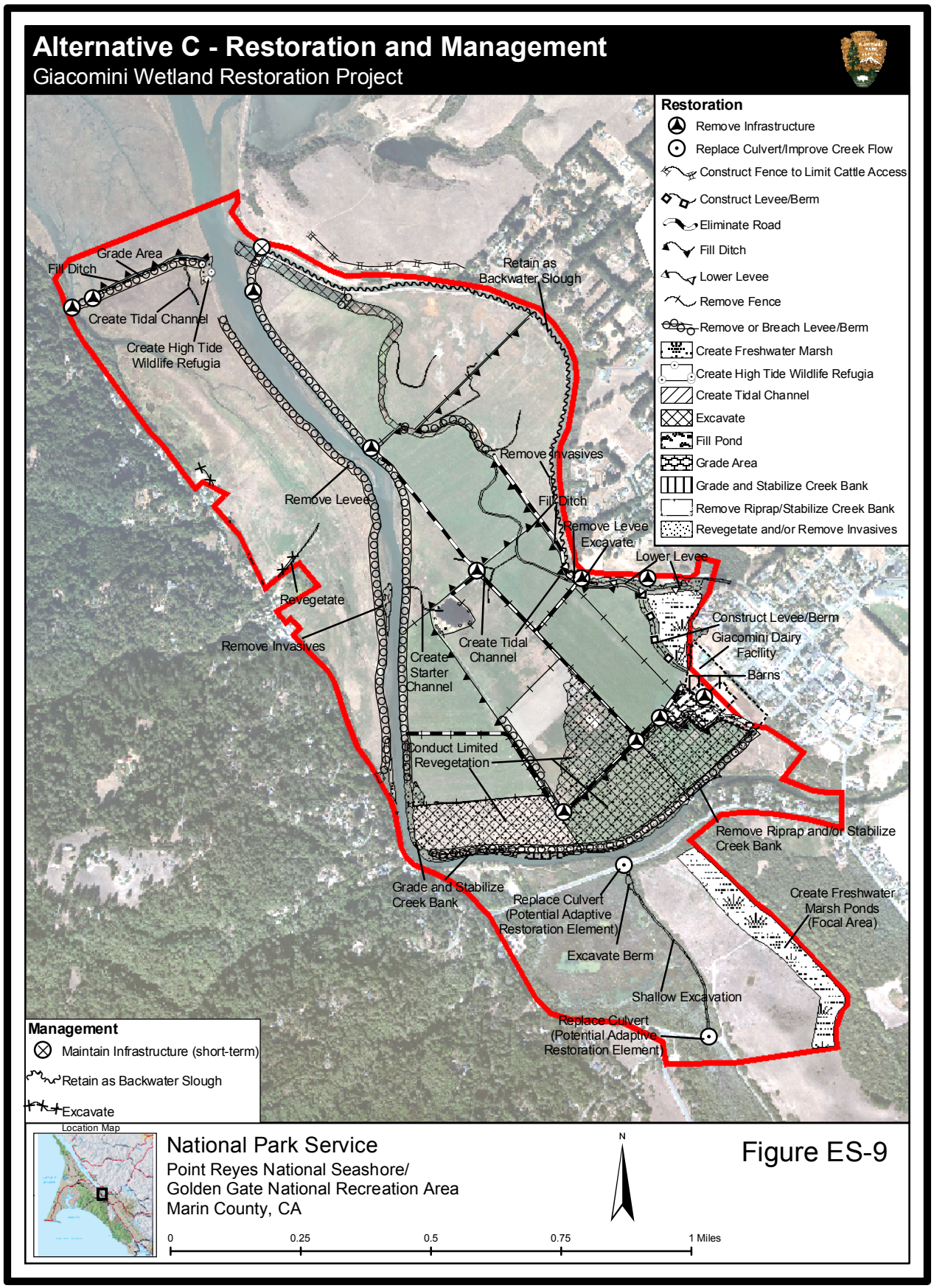
Alternative C incorporates a substantial amount of restoration and provides resource-compatible public access opportunities on the southern and eastern perimeters of the Project Area. Because Alternative C offered the best combination of restoration and public access benefits, it was initially selected as the agencies' preferred alternative in the DEIS/EIR, even though it was not the environmentally preferred alternative (Alternative D). However, based on public and agency comment, the Seashore and CSLC elected to choose Alternative D as the preferred alternative in the FEIS/EIR, because it offered the most opportunity for restoration while still providing opportunities for visitors and residents to experience and enjoy the restored wetlands.

Restoration – East Pasture

- Removal of Agricultural Infrastructure
- Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds
- Creek Bank Graded to More Stable Profile and Revegetated
- Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture
- Complete Removal of Levee in East Pasture
- Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment
- Deepening of Historic Slough and Creation of New Tidal Channels
- Creation of New Lagunitas Creek Tidal Side-Channel
- Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle
- Installation of Fencing on Martinelli Ranch
- Scraping of Southern Portion of East Pasture to Remove Non-Native, Weedy Plants
- Removal of Invasive Plant Species
- Revegetation in East Pasture

Restoration – West Pasture

- Removal of Agricultural Infrastructure


Alternative C - Restoration and Management
Giacomini Wetland Restoration Project
Restoration
Remove Infrastructure
Replace Culvert/Improve Creek Flow
Construct Fence to Limit Cattle Access
Construct Levee/Berm
Eliminate Road
Fill Ditch
Lower Levee
Remove Fence
Remove or Breach Levee/Berm
Create Freshwater Marsh
Create High Tide Wildlife Refugia
Create Tidal Channel
Excavate
Fill Pond
Grade Area
Grade and Stabilize Creek Bank
Remove Riprap/Stabilize Creek Bank
Revegetate and/or Remove Invasives
Grade Area
Fill Ditch
Create Tidal Channel
Create High Tide Wildlife Refugia
Retain as Backwater Slough
Remove Invasives
Remove Levee
Fill Ditch
Remove Levee
Excavate
Lower Levee
Revegetate
Remove Invasives
Create Starter Channel
Create Tidal Channel
Construct Levee/Berm
Giacomini Dairy Facility
Barns
Conduct Limited Revegetation
Remove Riprap and/or Stabilize Creek Bank
Grade and Stabilize Creek Bank
Replace Culvert (Potential Adaptive Restoration Element)
Create Freshwater Marsh Ponds (Focal Area)
Excavate Berm
Shallow Excavation
Replace Culvert (Potential Adaptive Restoration Element)
Management
Maintain Infrastructure (short-term)
Retain as Backwater Slough
Excavate
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure ES-9

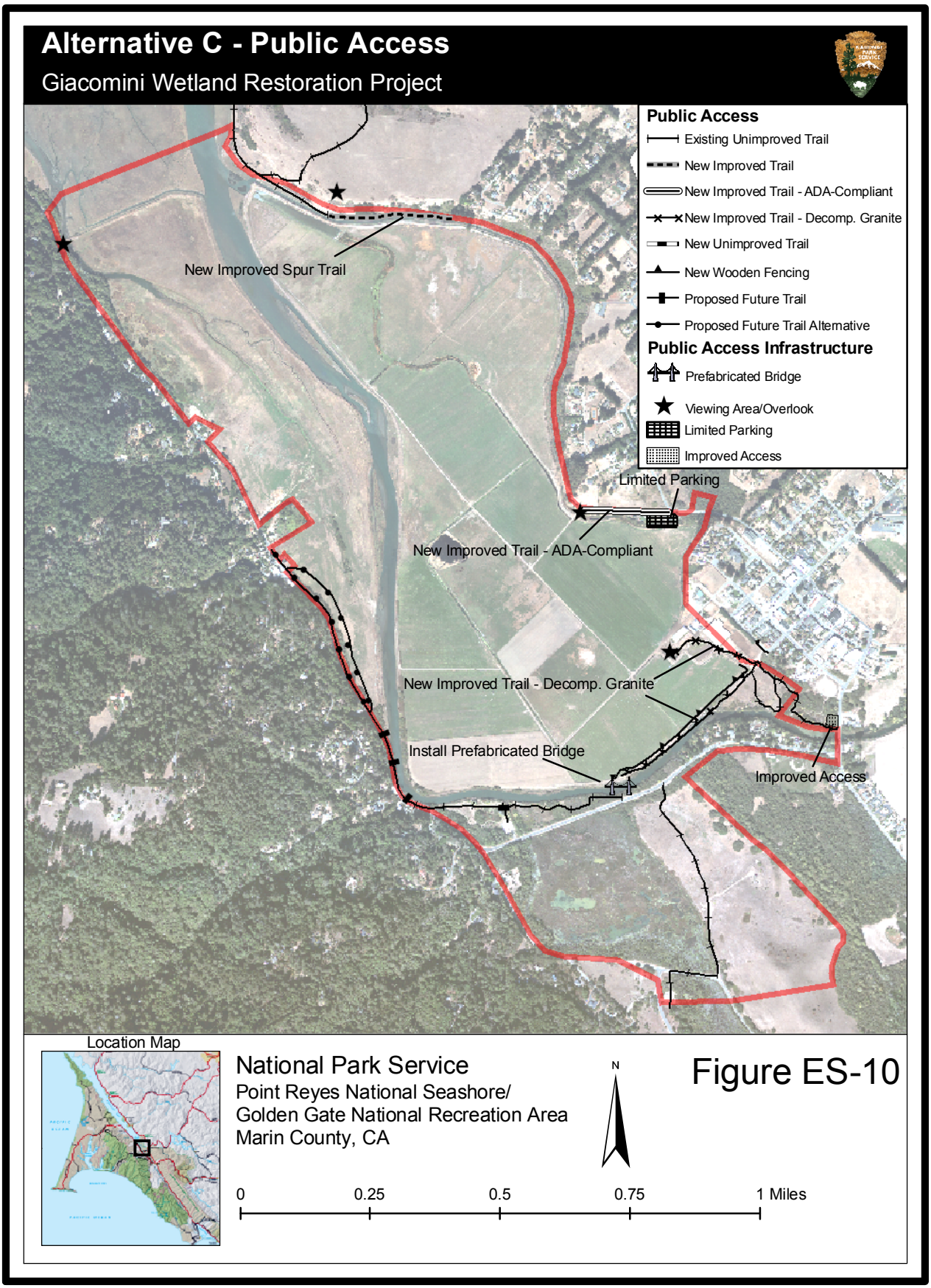

Alternative C - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Trail
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
New Unimproved Trail
New Wooden Fencing
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Prefabricated Bridge
Viewing Area/Overlook
Limited Parking
Improved Access
New Improved Spur Trail
Limited Parking
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
Install Prefabricated Bridge
Improved Access
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure ES-10

- Complete Removal of Levee in West Pasture and Filling of Borrow Ditch
- Creation of New Tidal Channels
- Removal of Invasive Plant Species
- Revegetation in West Pasture

Restoration – Olema Marsh

- Implement Adaptive Restoration in Olema Marsh
- Pre-Adaptive Restoration Component: Excavate to Create Frog Habitat near Olema Creek to Offset Impacts to Frogs with Restoration of Olema Marsh
- Adaptive Restoration Component #1: Excavate Vegetated Earthen Berm and Create More Defined Flow Path for Bear Valley Creek
- Adaptive Restoration Component #2 and/or 3: Potential Future Replacement of Levee Road and/or Bear Valley Culvert with Small Causeway, Bridge, Larger Culvert, or Series of Large Culverts as part of Adaptive Restoration Approach.

Management

- Same as described under Actions Common to All Alternatives under the No Action Alternative.

Public Access

- Creation of Southern Perimeter Through-Trail from Point Reyes Station to existing White House Pool County park via a Permanent Pedestrian/Bike Bridge near Location of Old Summer Dam
- Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County
- Potential Replacement of Existing Wooden Footbridge over Bear Valley Creek in Olema Marsh with Pedestrian Causeway Integrated into Levee Road
- Creation of Eastern Perimeter Spur Trails, Including ADA-Compliant Spur Trail, Through Extension of Tomales Bay Trail and Mesa Road Ranch Access Road
- Construction of Viewing Areas, Overlooks, and Interpretative Exhibits

Construction

- Construction would occur in the East and West Pastures of the Giacomini Ranch and Olema Marsh. The restoration component in the Giacomini Ranch would be constructed over a period of two construction years or seasons. The Olema Marsh restoration component would be constructed over a longer period commensurate with the proposed adaptive management approach. The public access component would be constructed over a period of approximately two years during and/or after restoration is completed: the exact timing of construction is dependent on the Park Service and CSLC securing funding.
- Construction would result in excavation of approximately 211,000 cubic yards of soil and at least 940 cubic yards of concrete, pipe, demolition debris and other non-soil materials. This includes approximately 3,000 and 450 cubic yards of shallow excavation in Olema Marsh and Bear Valley Marshes, respectively, most of which would be sidecast. It also includes approximately 11,000 cubic yards of excavation for mitigation ponds adjacent to Olema Creek, a component that was recently incorporated into the proposed project.
- Fill would involve re-use of approximately 76,250 cubic yards of excavated sediment on-site. Approximately 125,250 cubic yards of sediment would be hauled to abandoned quarries in the Tomales Point portion of the Seashore. Excavated sediment under this alternative would be used to restore the Grossi, Evans, McClure DG, Evans-Abbotts, and McClure Flat quarries under a

separate project. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

- Dump trucks hauling excavated materials would use local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, Levee Road, Pierce Point Road, and state highways such as State Route 1. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, a pasture to reach quarries. Traffic control may be required on Levee Road during bridge installation; Sir Francis Drake Boulevard during equipment mobilization/demobilization and hauling of excavated sediments; and potentially on Levee Road and/or Bear Valley should culverts on Bear Valley Creek eventually be replaced as part of the adaptive restoration of Olema Marsh.

Alternative D (Environmentally and Agency- Preferred Alternative) – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access

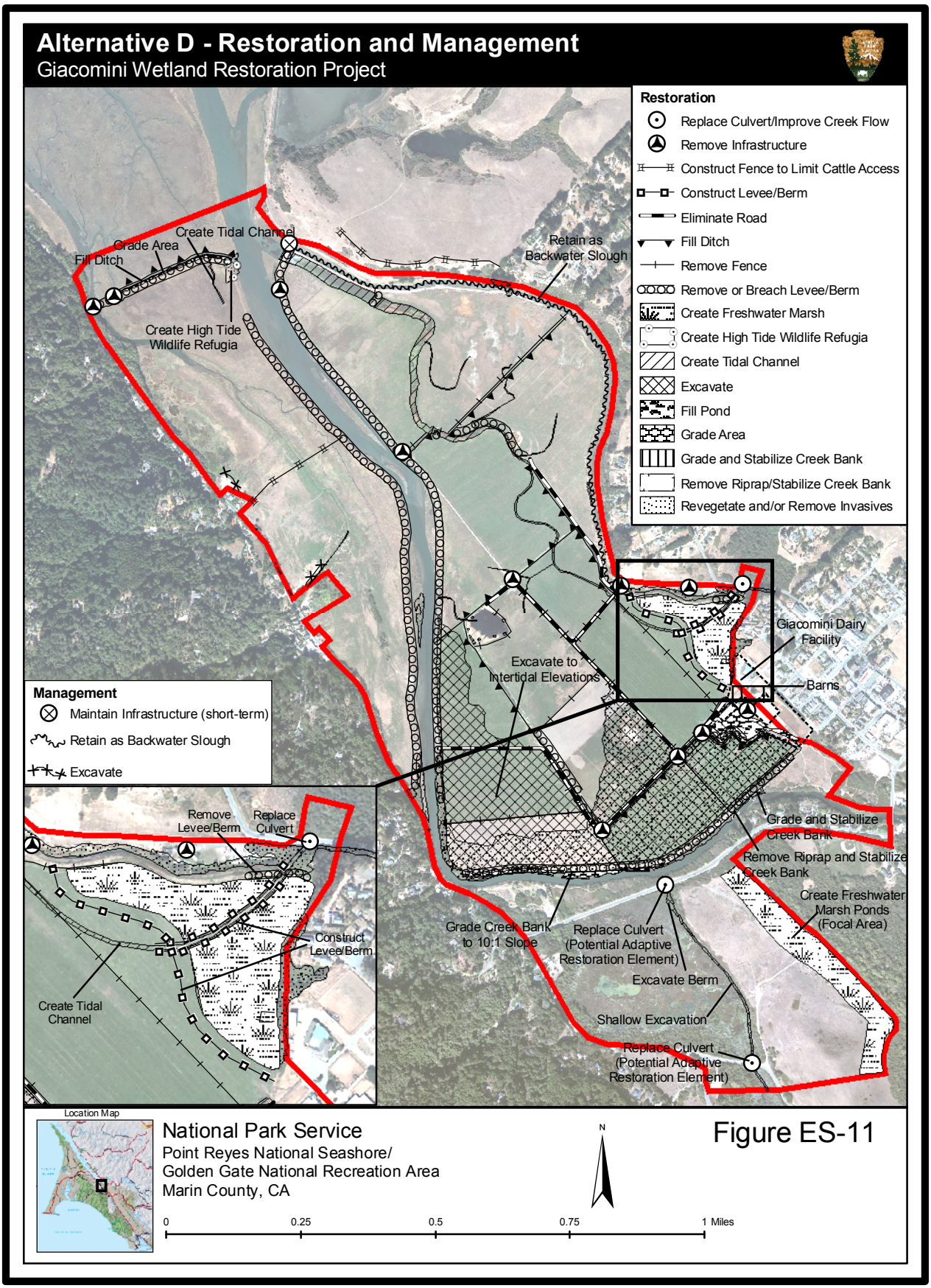
This alternative is very similar to Alternative C with no changes in the West Pasture (ES Figure 11). The very southern end of the East Pasture would be excavated to bring elevations down to active floodplain and intertidal marshplain elevations. The extent of excavation is dependent on securing additional funding to offset earthmoving and hauling costs, but it would not exceed 32.5 acres. Tomasini Creek would be fully realigned into one of its historic channel alignments, and the Mesa Road culverts on Tomasini Creek would be replaced to improve hydraulic connectivity, creek flow, and passage of salmonid species. As with Alternative C, there would be an adaptive restoration approach proposed for Olema Marsh that would include a phased approach to shallow channel excavation, vegetated berm removal, and potential replacement of Levee Road and Bear Valley Road culverts in the future should initial restoration efforts not achieve the desired degree of success.

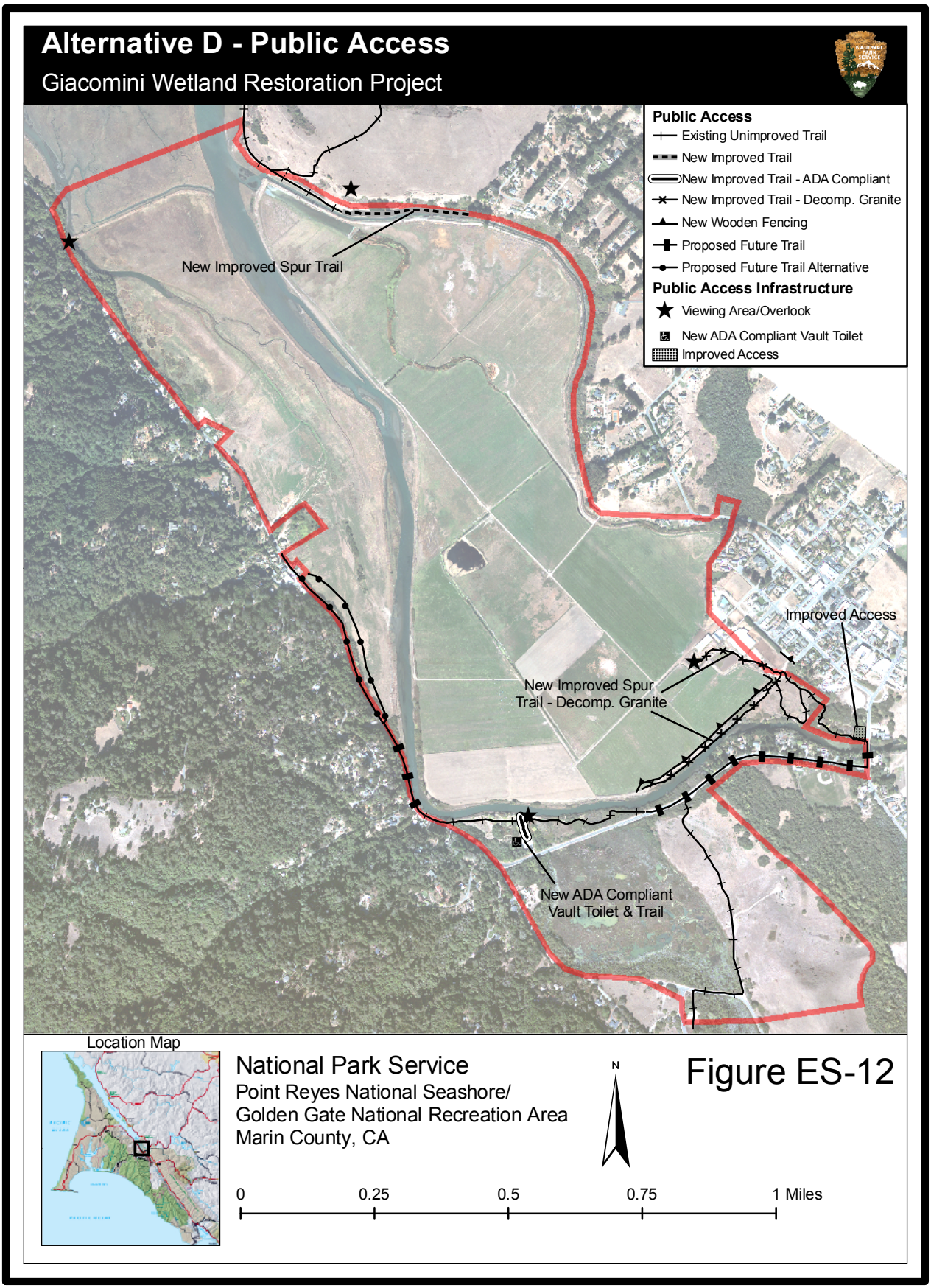
Public access components of Alternative D would include construction of a spur trail to the edge of the Dairy Mesa and an improvement of the existing spur trail on the southern perimeter of the East Pasture (ES Figure 12). On the eastern perimeter, a spur trail would be created on the historic railroad grade that would extend the existing Tomales Bay Trail. The FEIS/EIR also incorporates a new public access component: ADA-compliant access would be provided through improvement of trail facilities and construction of a small viewing platform at White House Pool County park.

Based on public and agency comment, certain access elements would appear to require further study, analysis, and scoping and would therefore not be considered "ripe for decision" by NEPA standards. While Alternative D does not have a non-vehicular bridge across Lagunitas Creek as was proposed under Alternatives A-C, the Park Service would commit to working in the future with the County of Marin on development of additional access facilities on the southern perimeter, including a potential trail on Levee Road and Green Bridge, extension of a trail to Inverness Park, and/or construction of a non-vehicular bridge across Lagunitas Creek at the site of the old summer dam through a separate environmental compliance process.

Restoration – East Pasture

- Removal of Agricultural Infrastructure
- Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds
- Creek Bank Graded to More Stable Profile and Revegetated
- Removal of Riprap and Regrading of Creek Bank in Southern Portion of East Pasture
- Complete Removal of Levee in East Pasture
- Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment
- Replace Tomasini Creek Culverts at Mesa Road


Alternative D - Restoration and Management
Giacomini Wetland Restoration Project
Restoration
Replace Culvert/Improve Creek Flow
Remove Infrastructure
Construct Fence to Limit Cattle Access
Construct Levee/Berm
Eliminate Road
Fill Ditch
Remove Fence
Remove or Breach Levee/Berm
Create Freshwater Marsh
Create High Tide Wildlife Refugia
Create Tidal Channel
Excavate
Fill Pond
Grade Area
Grade and Stabilize Creek Bank
Remove Riprap/Stabilize Creek Bank
Revegetate and/or Remove Invasives
Management
Maintain Infrastructure (short-term)
Retain as Backwater Slough
Excavate
Create Tidal Channel
Grade Area
Fill Ditch
Create High Tide Wildlife Refugia
Retain as Backwater Slough
Giacomini Dairy Facility
Barns
Excavate to Intertidal Elevations
Remove Levee/Berm
Replace Culvert
Construct Levee/Berm
Create Tidal Channel
Grade and Stabilize Creek Bank
Remove Riprap and Stabilize Creek Bank
Create Freshwater Marsh Ponds (Focal Area)
Grade Creek Bank to 10:1 Slope
Replace Culvert (Potential Adaptive Restoration Element)
Excavate Berm
Shallow Excavation
Replace Culvert (Potential Adaptive Restoration Element)
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure ES-11


Alternative D - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Trail
New Improved Trail - ADA Compliant
New Improved Trail - Decomp. Granite
New Wooden Fencing
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Viewing Area/Overlook
New ADA Compliant Vault Toilet
Improved Access
New Improved Spur Trail
Improved Access
New Improved Spur Trail - Decomp. Granite
New ADA Compliant Vault Toilet & Trail
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure ES-12

- Deepening of Historic Slough and Creation of New Tidal Channels
- Creation of New Lagunitas Creek Tidal Side-Channel
- Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle
- Installation of Fencing on Martinelli Ranch
- Shallow Scraping of Southern Portion of East Pasture to Remove Non-Native, Weedy Plants
- Potential Excavation of Southwestern Portion of East Pasture to Active Floodplain and Intertidal Marshplain Elevations
- Removal of Invasive Plant Species
- Revegetation in East Pasture

Restoration – West Pasture

- Same as described under Alternative C

Restoration – Olema Marsh

- Same as described under Alternative C

Management

- Same as described under Actions Common to All Alternatives under the No Action Alternative

Public Access

- Creation of Southern Perimeter Spur Trail from Point Reyes Station to Location of Former Summer Dam
- Potential for Park Service to Work with County of Marin in the future on Expansion of Public Access Facilities on Southern Perimeter
- Construction of an ADA-Compliant Trail, Low-Elevation Viewing Platform, and Vault Toilet Facility at White House Pool County park
- Creation of Eastern Perimeter Spur Trail Through Extension of Tomales Bay Trail
- Construction of Viewing Areas, Overlooks, and Interpretative Exhibits

Construction

- Construction would occur in the East and West Pastures of the Giacomini Ranch and Olema Marsh. The restoration component in the Giacomini Ranch would be constructed over a period of two construction years or seasons. The Olema Marsh restoration component would be constructed over a longer time period commensurate with the proposed adaptive management approach. Replacement of the Tomasini Creek culvert at Mesa Road would likely also occur after restoration in Giacomini Ranch due to the need to raise funds. The public access component would be constructed over a period of approximately two years during and/or after restoration is completed: the exact timing of construction is dependent on the Park Service and CSLC securing funding.
- Construction would result in excavation of approximately up to 257,000 cubic yards of soil (depending on whether the Park Service receives funding for excavation in southern portion of East Pasture) and 1,100 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 45,600 cubic yards of soil. Total excavation includes the approximately 3,000 and 450 cubic yards of shallow excavation in Olema Marsh and Bear Valley Marshes, respectively, most of which would be sidecast. It also includes approximately 11,000 cubic yards of excavation for mitigation ponds adjacent to Olema Creek.

- Fill would involve re-use of approximately 76,000 cubic yards of excavated sediment on-site. Approximately up to 170,000 cubic yards would be hauled to abandoned quarries in the Tomales Point portion of the Seashore, with final total dependent on whether funding for excavation in southern portion of East Pasture can be obtained. Excavated sediment under this alternative would be used to restore the Grossi, Evans, McClure DG, and Evans-Abbotts quarries under a separate project. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.
- Dump trucks hauling excavated materials would use local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, Levee Road, Pierce Point Road, and state highways such as State Route 1. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, a pasture to reach quarries. Traffic control measures may be needed on Sir Francis Drake Boulevard during equipment mobilization/demobilization and hauling of excavated sediments; Mesa Road during replacement of the Tomasini Creek culvert; and potentially on Levee Road and/or Bear Valley should culverts on Bear Valley Creek eventually be replaced as part of the adaptive restoration of Olema Marsh.

Affected Environment/Environmental Consequences and Mitigation Measures

Land Use and Planning – General Land Use

Tomales Bay and the Point Reyes region falls within a complex, multi-jurisdictional region, with lands in a variety of ownership, including private, County, local water districts, state agencies (California State Land Commission, California State Parks, Wildlife Conservation Board, CalTrans), and federal agencies such as the Park Service, the U.S. Coast Guard, and the Gulf of the Farallones National Marine Sanctuary. Applicable land use plans or other documents that guide development in the Project Area include the Seashore's General Management Plan, the Point Reyes Station Community Plan, the Marin County Local Coastal Program (LCP) Unit II, the Marin Countywide Plan, and the Marin County Zoning Ordinance.

The impacts of Alternatives A, B, C, and D would generally range from minor adverse to major beneficial on general and park-related land use and development policies in the Seashore and local community. The No Action Alternative would have a moderate beneficial effect on natural resources on parklands through a small wetland restoration/mitigation component and the discontinuation of intensive agricultural management practices, if not necessarily grazing. All of the action alternatives -- Alternatives A – D -- would have a major beneficial effect on natural resources on parklands through restoration of the East Pasture, discontinuation of agricultural management practices and grazing, and removal of agricultural infrastructure. Unlike the No Action and Alternatives A and B, Alternatives C and D would either partially or fully comply with objectives stated in the Point Reyes Station Community Plan regarding realignment of Tomasini Creek in the Project Area into its historic alignment, as well as restoration of former tidal marshes at the head of Tomales Bay. The proposed project would not either directly or indirectly induce substantial growth in the local community or increase density beyond population projections.

All of the alternatives have the potential, particularly in combination with some proposed and reasonably foreseeable housing development projects in Point Reyes Station, to have a minor adverse effect on the rural character and functioning of the local community by causing a noticeable change in conditions, but this change would not be expected to fundamentally alter the rural nature of the local community and environs.

Land Use and Planning – Agricultural Land Use

Farmland is protected under various federal, state, and local laws, regulations, and policies. At a federal level, the Farmland Protection Policy Act is intended to minimize the impact federal programs have on the unnecessary conversion of farmland to non-agricultural uses. Because of the value of agriculture to Marin's economy and its scenic pastoral landscape, the County and Coastal Zone LCP (Marin County Comprehensive Planning Department 1981) have both identified maintenance of agriculture as a high priority.

Under the No Action Alternative, the conversion from dairy to park lands would comply with local policies on conversion of agricultural lands and lands protected under the Williamson Act, because it would either be retained as grazing land or converted to open space, which are allowable uses of agricultural lands. For

Alternatives A - D, this conversion would comply with local policies on conversion of agricultural lands and lands protected under the Agricultural Production Zone zoning, because it would be converted to open space or nature refuge, which are, respectively, approved or conditional uses for these types of agricultural lands. All of the alternatives would also comply with exemptions in LCP agricultural land use policies for conversions of lands that were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)). The extensive amount of wetlands present, combined with the frequency of large-scale flooding and prolonged inundation due to its location in the bottomlands of an alluvial valley just downstream of the confluence of several major creeks, also lessens the long-term suitability and viability of these lands for agriculture. During its operation as a dairy, the Giacomini family has been required to intensively manage these lands through levees, tidegates, culverts, ditching and dredging, pumping, and irrigation to maintain a viable dairy operation. Alternatives A-D would also comply with LCP policies that call for agriculture in federal parklands to be maintained unless incompatible with resource protection, because agricultural uses would either be reduced or discontinued in area that is more than 90 percent wetland.

Based on an analysis conducted using California's Land Evaluation and Site Analysis model, conversion of the Giacomini Ranch from a dairy to open space or wildlife refuge would represent only a negligible or minor adverse impact on agricultural land use in the local community, depending on whether leased grazing is approved under the No Action Alternative. However, cumulative effects of other ranches closing could increase impacts from loss of the dairy to West Marin agriculture.

Geologic Resources

The Project Area has been sharply defined by this region's unique geologic history. The San Andreas Fault, responsible for the 1906 Earthquake that devastated San Francisco, runs directly through the Project Area and Tomales Bay. The San Andreas Fault is perhaps the best known fault in California, although there are more than 20-30 other faults in the San Francisco Bay region. Tomales Bay is a relatively shallow estuary that has formed within the long, linear, submerged "rift" valley that has developed between the northwestward-moving Pacific plate and the continental North American plate.

The geologic impacts of the alternatives are largely related to topographic changes and the attraction of visitors to highly seismically active area. The No Action Alternative would have negligible effects on topographic resources because of implementation of the wetland mitigation/restoration component. Alternatives A and B would have moderate beneficial effects on topographic resources, because changes in topographic resources would involve primarily the removal of fill to restore historic marsh conditions with the exception of fill placement required for trail creation. The most apparent change in Alternatives C and D relative to the other action alternatives is the appreciable increase in the amount of area in which topographic conditions would be changed (from approximately 75 to 90-95 percent), as well as the amount of area that would be subjected to more intensive excavation and fill activities (> 1.0 foot). Most of this increase would come from changes in Olema Marsh, which would subside as a result of improved hydraulic connectivity and drainage of waters afforded by the proposed restoration activities. The adaptive restoration approach proposed could result in anywhere form 0.66 to 3 feet of surface elevation lowering or subsidence from oxidation and decomposition of extensive peat material present in Olema Marsh. The other change under Alternative D is the shallow excavation of the southeastern portion of the East Pasture to active floodplain and intertidal marshplain elevations, which causes a slight increase in areal extent and average depth of fill or excavation relative to Alternative C. Under Alternatives B-D, there is also the potential for construction of a low berm in the western portion of the West Pasture to protect private properties from increased flooding if levees are breached or removed.

Under Alternatives A, B, and C, there would be potential minor adverse impacts on public safety related to geologic hazards associated with construction of new trails on the southern and eastern perimeter and a bridge across Lagunitas Creek and possible extension of the southern perimeter trail to Inverness Park. These impacts would be no more than minor, because of the small number of people expected to visit these facilities compared to other major destination areas within the parks and the relatively low probability of a major earthquake in the Project Area vicinity. The most substantial change in Alternative D relative to Alternative C is the removal of the bridge under the public access component, which reduces, if not eliminates, potential threats to public safety from geologic hazards such as surface fault ruptures.

Soil Resources

One of the most valuable functions that wetlands can contribute to improving the health of a watershed is filtration and/or transformation of nutrients, sediment and contaminants in associated surface and ground

water sources. Soluble and sediment-bound nutrients, sediment, bacteria, and contaminants such as metals and pesticides can enter wetlands through tidal or freshwater flow and are often retained through being bound to sediment. Through binding to sediment or assimilation by plants, natural wetlands are believed to remove as much as 20 to 50 percent of nitrogen, phosphates, and metals from source waters (Kadlec and Knight 1996).

With the increasing number of wetland restoration projects in San Francisco Bay and the central California coast in the past decade, concerns have been raised among biologists and hydrologists that these stable "sinks" for contaminants could potentially become "sources" of contamination to the environment (Davis et al. 2003). This remobilization could potentially reduce productivity and filtering functions of wetlands, create water quality problems, or reintroduce toxins that may be uptaken by wildlife (Davis et al. 2003).

Under the No Action Alternative, the potential shift from a dairy to either leased grazing and/or open space lands would result in a minor to moderate reduction in nutrients. This is because, even if leased grazing is permitted in the future, it would be of a much lesser scale and intensity than current operations. The dairy often disposes of manure through concentrated application in certain pastures with light application elsewhere in the East Pasture.

Under Alternatives A-D, removal of cattle and discontinuation of agricultural management would result in moderate reductions in sediment nutrient concentrations over the long-term. However, hydrologic reconnection of the Giacomini Ranch to Lagunitas Creek would increase the potential for influxes of nutrient-laden waters from fluvial and tidal sources, including Lagunitas Creek. The largest differences in soil impacts between the action alternatives come from the removal of levees along Lagunitas Creek, restoration of Olema Marsh, and rerouting of Tomasini Creek into one of its historic alignments in the East Pasture.

Under Alternatives C-D, where Olema Marsh would be restored, decreases in surface water levels associated with improved hydraulic connectivity and subsequent dewatering of Olema Marsh would expose flooded peat soils to air and cause rapid compaction through accelerated rates of organic matter decomposition that would have appreciable effects on soil nutrient pools. These changes would be expected to have minor short-term adverse impacts on soil nutrient conditions through rapid release of nutrients to overlying waters, but long-term effects would be considered beneficial as nutrient levels and rates of nutrient processing began to approach conditions more characteristic of natural undiked marshes.

Sediment contaminant concentrations in the Giacomini Ranch, which appear to be very low currently (Parsons and Allen 2004c), might increase from removal of levees along Lagunitas Creek and/or Tomasini Creek. The risk of potential contaminant exposure generally increases from the No Action Alternative through Alternative D, consistent with the increase in the amount of levee breaching or removal and culvert replacement. Recent sampling by the Regional Water Quality Control Board shows that most of the mercury released by the Gambonini mine in the Walker Creek watershed is at least currently concentrated in outer Tomales Bay, so the potential risk of mercury contamination in the Project Area appears negligible at this time. A higher potential for exposure to contaminants would probably come from rerouting of Tomasini Creek into one of its historic alignments through the East Pasture. Creek channels and floodplain in the East Pasture may become exposed to potential contaminant sources in Tomasini Creek that may have originated from the now-closed West Marin Landfill, which was constructed in the upper portion of the creek's watershed. In terms of Olema Marsh, the apparent absence of any contaminant sources in the Bear Valley Creek subwatershed would suggest that the risk of contaminant release from oxidation of peat and saline mineral soils in the marsh would be negligible.

From a watershed perspective, this alternative would have negligible to perhaps minor beneficial effects on the quality of subtidal and intertidal sediments in Tomales Bay through a potential decrease in loading of nutrients, contaminants, and other pollutants from Lagunitas Creek due to increased connectivity of the creek with its historic floodplain on the Giacomini Ranch.

Air Resources – Air Quality

The Seashore and north district of the GGNRA are classified as a Class I area under the Clean Air Act (42 USC 7401 et seq.). The Act requires land managers of Class I areas to protect air quality and related values, including visibility, plants, animals, soils, water quality, cultural and historic structures, and visitor health from the effects of air pollution.

Federal air quality standards have been set for seven pollutants, including ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), and particulate matter. The California Air Resources Board (CARB) has set stricter

ambient air quality standards than national standards. Under the 1988 California Clean Air Act, air basins were designated as attainment, non-attainment, or unclassified for the state standards. The Bay Area Air Basin (SFBAAB) is classified as a state non-attainment area for ozone and particulate matter and a federal non-attainment area for ozone. State air quality agencies and other federal agencies are required to demonstrate conformity of actions to national air quality standards or, in the case of federal agencies, applicable SIPs developed by state air quality agencies. BAAQMD has prepared SIPs to address nonattainment and maintenance issues related to the national ozone standards and the national carbon monoxide standard and is in the process of revising the ozone SIP in collaboration with the Association of Bay Area Governments and MTC. Federal actions cannot cause or contribute to new violations, increase the frequency or severity of any existing violation, interfere with timely attainment or maintenance of a standard, delay emission reduction milestones, or contradict the State Implementation Plan.

A recent Park Service report states that "there are no significant air pollution effect concerns in this park [the Seashore] at the present time" (Sullivan et al. 2001). Some of the greatest threats to air quality within the Seashore and the western portions of Marin County come from the more urbanized eastern portions of the county and Bay Area, although the coast is buffered from these adverse influences by mountains and strong offshore winds.

Alternatives A-D would generally have negligible air quality impacts during construction, except for carbon monoxide and nitrogen dioxide (NOX). Under Alternative A, equipment used for earthmoving would potentially generate short-term, temporary moderate adverse effects on air quality during construction in the East Pasture from NOX emissions during the first construction year or season. Alternative C would potentially have moderate impacts from NOX emissions and minor impacts from CO emissions during both construction years. Under Alternative D, NOX emissions would increase relative to Alternative C from the more intensive restoration efforts proposed in the East Pasture during the second construction year or season, potentially becoming major under NEPA and substantial and significant under CEQA. These adverse effects would be mitigated to less than significant under CEQA and moderate under NEPA through implementation of Best Management Practices (BMPs) recommended by the Bay Area Air Quality Management District (BAAQMD 1999) such as minimizing idling time to 5 minutes and limiting the number of concurrently operating pieces of construction equipment. While the amount of earthmoving proposed under these alternatives would not seem to have the potential for more than a negligible adverse impact on PM10 emissions, the agencies would commit to construction BMPS such as watering down construction areas and haul routes, where feasible, and washing of tire trucks before existing the Project Area to minimize dust generation.

Air quality impacts following construction would involve primarily emissions from vehicles and trucks associated with visitors and residents using existing public access facilities, as well as, to a lesser degree, property maintenance activities. Based on the number of maximum or peak vehicles projected on an hourly or daily basis, these effects would generally range from negligible adverse for the No Action Alternative and Alternatives C and D to negligible adverse (total emissions) and minor adverse (carbon monoxide) for Alternatives A and B. Under Alternatives A and B, impacts would be slightly higher, because there are a higher number of or more extensive public access facilities that would be expected to attract more visitors and residents.

All of the alternatives would have a long-term minor beneficial effect on odors in the local community with conversion from the dairy to either open space or grazed lands. There may be some adverse effects during construction and over the short-term from disturbance of wetland (anoxic) and manure-laden soils. Short-term adverse effects would generally range from negligible under Alternatives A and B to moderate under Alternatives C and D. The increase in intensity of odor impacts under Alternatives C and D would potentially come from drainage-related decomposition of organic matter and related chemical changes in Olema Marsh.

Air Resources - Noise and Soundscapes

Unlike more urban parks, the Seashore and north district of GGNRA are located in a rural portion of western Marin County and must contend less with the intrusive influences of urbanization in terms of noise than southern portions of the GGNRA. In rural areas such as west Marin, major producers of undesirable human-caused sound are limited to automobile and truck traffic, jet airplanes, individual businesses, agricultural ranch activities, and individual construction projects. The Park Service is directed to preserve, to the greatest extent possible, the natural soundscapes of parks and to protect natural soundscapes from degradation due to noise, defined as "undesirable human-caused sound" (NPS 2001, Section 4.9). A number of federal, state, and local agencies have established policies regarding the maximum amplitude or peak pressure of the sound wave, which are measured in decibels. In 1994, the Marin County Noise Element mandated that residences,

public spaces, and institutions not be subjected to noise levels above an average of 60 decibels (dB) over a 24-hour period or 60 dB-Ldn. Ldn refers to noise averaged over a 24-hour period or the Day-Night Equivalent Sound Level.

In general, construction-related traffic associated with hauling of excavated sediments would have only negligible to minor effects on soundscapes along local and regional roadways and on most of the sensitive receptors or residences near the Project Area because of attenuation of noise with distance and natural sound barriers. Hauling of excavated sediments to quarries in the Pierce Point Road vicinity would, however, potentially generate a minor increase in ambient noise levels during construction. Also, there are several sensitive noise receptor areas identified within the Project Area, where activities will be conducted in close proximity of homes on Levee Road, 3rd and C Streets in Point Reyes Station, and Sir Francis Drake Boulevard. In these sensitive noise receptor areas, there is potential under Alternatives A-D for noise to temporarily exceed 75 dBA. This would be considered a substantial and significant impact under CEQA and a major impact under NEPA. While these impacts cannot be eliminated, they have been reduced to a moderate level under NEPA and a less-than-significant level under CEQA through adoption of noise-reducing construction management practices that include reducing the number of concurrently operating pieces of equipment and pushing back construction start times to 8 a.m. in sensitive construction zones.

Following construction, most of the impacts on soundscapes and ambient noise conditions would be associated with increases in visitation and traffic due to construction or expansion of public access structures, facilities, and attractions/uses. The No Action Alternative would actually have a minor beneficial effect, because there would be no construction of new public access facilities, and loud and sharp noises associated with dairying such as milk trucks, hay trucks, earthmoving equipment, and ATVs would be discontinued with close of the dairy. Under Alternatives A-C, beneficial effects from closure of the dairy would be slightly offset by potential increases in ambient noise from the higher numbers of vehicles on local roadways. In addition, under Alternatives A and B, noise may potentially increase relative to existing conditions in areas such as 3rd and C Streets and Mesa Road in Point Reyes Station, where trailheads would either be retained or located, respectively. Construction of the eastern perimeter through-trail or spur trails under Alternatives A –C would also introduce a new source of noise for residents on the Point Reyes Mesa. Under Alternative C, the Point Reyes Station trailhead for the southern perimeter trail would be moved from 3rd and C Streets to the existing entrance for the Green Bridge County park on State Route 1 at the Green Bridge. Under Alternative D, the Mesa Road spur trail and the Lagunitas Creek bridge would be eliminated from the proposed project, thereby decreasing potential noise impacts.

Overall, under Alternatives A-C, project implementation have a negligible to minor adverse effect on ambient noise conditions for at least certain areas within the local community, although ambient noise conditions would not exceed the county noise ordinance of 60 dB-Ldn. Under the No Action Alternative and Alternative D, the effects on ambient noise would be overall beneficial.

Water Resources – Hydraulics and Hydrologic Processes

The purpose of the proposed project is to restore tidal and freshwater hydrologic processes such as natural creek action, tidal flooding, floodplain connectivity, and sediment transport within a significant portion of the Project Area. Being at the upstream end of the Tomales Bay estuary, the Project Area represents the largest transitional zone between marine and freshwater influences within the watershed. Both tidal and freshwater hydrologic processes are important to the Project Area and are the cornerstone for almost all of the other functions provided by wetland ecosystems.

The extent of area subject to tidal action would be expanded appreciably under all of the action alternatives, with the largest increase coming from activities associated with restoration of the East Pasture. Removal of levee infrastructure and improvements in hydraulic connectivity between Giacomini Ranch, Olema Marsh, and Lagunitas Creek would increase the extent of area subject tidal flooding on a daily basis from 11 acres under existing conditions to more than 252 acres under Alternative D. The effects of the proposed project remain only moderate even under the most extensive alternatives, because the high elevations that currently exist within the Giacomini Ranch due to flood-related sediment deposition and fill activities would limit the extent of daily tidal influence, although higher areas would be subject to more infrequent tidal flooding. The degree of tidal influence in Olema Marsh would continue to be dictated under all alternatives by the continued presence of Levee Road, however, possible culvert replacement under Alternatives C-D would increase the extent and frequency of tidal action.

Freshwater creek or fluvial hydrologic processes would also be beneficially affected by the proposed project.

The proposed project would remove, replace, or reduce the scale of hydrologic infrastructure and management practices, many of which have affected fluvial hydrologic processes such as culverts, levees, and ditching. The estimated percent change in the number of infrastructure, facilities, and management practices in the Project Area would range from 12 percent under the No Action Alternative to 44 percent under Alternative D. Certain infrastructure and facilities such as Levee Road, Bear Valley Road, the Tomasini Creek tidegate and culverts, and culverts for Inverness Ridge drainages must remain in place because of community need or the presence of special status species, thereby slightly reducing the potential to fully restore natural creek processes, particularly in Olema Marsh.

Currently, most of the tidal and fluvial flow in the portion of Lagunitas Creek in the Project Area is restricted to the narrow corridor defined by the Giacomini Ranch levees and Levee Road. Based on computer modeling, Lagunitas Creek levees currently only overtop during larger storm events ranging from 3.5- to 12 years (KHE 2006a). Breaching and removal of the Giacomini Ranch under Alternatives A-D levees would result in floodwaters overtopping creek banks more frequently on as much as a 2-year basis (KHE 2006a). In addition, under Alternatives C and D, Tomasini Creek is either partially or wholly rerouted into one of its historic channel alignments, thereby increasing interaction of this creek with its historic floodplain. Increasing the frequency and extent to which streams may access historic floodplains would result in moderate beneficial effects (Alternative A) to major beneficial effects (Alternatives B-D) to floodplain process, floodwater retention, and, ultimately, water quality conditions within Tomales Bay (see Water Quality analysis). The cumulative volume of floodwater moving through floodplains in the Project Area would increase more than 1,000 percent under Alternative A (1,085 acre-feet) to as much as 2,000 percent under Alternatives C and D (approximately 2,050-2,075 acre-feet), a reduction of approximately 10- to 20 percent, respectively, in cumulative floodwater volume conveyed in Lagunitas Creek (KHE 2006a).

Watershed disturbances during the past 150 years have increased the amount of sediment being transported to Tomales Bay. Excessive sedimentation has not only caused the Bay to become shallower over the past 150 years, but has decreased the clarity and quality of waters. By removing levees, the proposed project could divert some of this sediment load from Lagunitas and other watershed creeks into the Project Area and measurably decrease the amount of sediment being transported downstream. Overall, the proposed project would result in the reduction of potentially 9.5 percent (Alternative A; 4,770 tons/day) to 19 percent (Alternatives D; 9,525 tons/day) of suspended sediment currently delivered to Tomales Bay during storm events through deposition within the Project Area. These reductions in sediment delivery could have profound implications in terms of improving the overall condition of the Bay for both wildlife and humans.

Water Resources –Water Quality

Perhaps, one of the most important functions that wetlands can provide in Tomales Bay is water quality improvement. While Tomales Bay is often considered a relatively pristine estuary, the failure of Tomales Bay to consistently meet water quality standards prompted the RWQCB to designate it as impaired under Section 303(d) of the Clean Water Act.

In general, the action alternatives will result in beneficial impacts to water quality in the Project Area through removal of the active dairy operation and restoration of hydrologic processes, floodplain connectivity, and tidal marsh. Under the short-term, beneficial effects would remain negligible to minor, because residual nutrients from dairying would be expected to decline gradually, and the transition from pasture to tidal marsh would cause dieback and decay of vegetation, which could decrease dissolved oxygen and pH and cause nutrient pulses. Under Alternatives C and D, beneficial effects would be reduced further over the short-term by temporary nutrient pulses and drops in pH and dissolved oxygen expected in Olema Marsh with lowering of water levels within the highly impounded system and reintroduction of limited tidal influence. These hydrologic changes would cause oxidation of organic matter and related biogeochemical changes in the largely peat soils and extensive dieback of vegetation, all of which would have temporary adverse impacts on water quality. However, as vegetative and hydrologic conditions stabilize in both the Giacomini Ranch and Olema Marsh, water quality conditions would also stabilize and improve, and, ultimately, Alternatives A-D would result in moderate to major beneficial effects on water quality in the Project Area over the long-term.

Benefits from the increased hydrologic connectivity would be more immediate at the Bay or watershed scale. As described earlier, the proposed project would result in the reduction of potentially 9.5 percent (Alternative A) to 19-percent (Alternatives D) of suspended sediment currently delivered to Tomales Bay during storm events through deposition within the Project Area. Evaluation of existing literature suggests that transport and deposition of other pollutants, including pathogens and some nutrient forms, are strongly correlated with suspended sediment transport processes, such that reductions in sediment would be expected to result in

reductions in nutrients, pathogens, and contaminants. There are no definitive numbers for the percentage of certain nutrients, contaminants, and pathogens that could be potentially retained on floodplains. However, studies have shown that natural wetlands can remove as much as 20 to 50 percent of nitrogen, phosphates, and metals (Kadlec and Knight 1996) and more than 90 percent of pathogens (CH2MHill 1991 in Kadlec and Knight 1996). Overall, the alternatives would be expected to result in minor to moderate beneficial effects to water quality at the watershed scale not only because of the elimination of nutrients and pathogens produced by dairying, but the hydrologic reconnection of the several small to large source creeks with their floodplains. These watershed-scale benefits would be even higher over the long-term, ranging from minor to moderate, as vegetation reestablishes in restored areas and potentially increases the percentage of pollutants retained on floodplains.

Vegetation Resources

Many native vegetation communities within the United States have been adversely impacted by introduction of non-native plant species, as well as a host of other anthropogenic factors such as commercial, residential, and agricultural development, and resource extraction. These activities have affected all vegetation communities, but the most highly publicized and pervasive threats are perhaps those to wetland and riparian communities. Wetlands and other native vegetation communities provide habitats for native plant species, some of which have decreased dramatically in numbers or range because of development and threats from non-native species.

The largest change to vegetation communities would come from the varying degrees of reintroduction of tidal action under Alternatives A-D. Restoration would result in a reduction of non-native Wet and Dry Pasture and Dry Grassland vegetation communities in the Giacomini Ranch portion of the Project Area from 25 percent under Alternative A to nearly 90 percent under Alternatives C and D as a result of levee breaching and removal and removal or replacement of culverts and tidegates. Over the short-term, benefits to native vegetation communities would either be reduced or offset by vegetation dieback and temporary invasion by weedy grass and brackish marsh species. Under Alternatives C-D, dewatering, subsidence or compaction of peat soils, and increased tidal influence with restoration of Olema Marsh would cause a temporary, but extensive dieback in Freshwater Marsh vegetation. However, over the long-term, most of the non-native pasture and brackish vegetation communities in the Giacomini Ranch would be converted to Tidal Brackish and Salt Marsh communities, which are largely dominated by native species, and, under Alternatives C-D, a mixture of Freshwater and Tidal Brackish Marsh would reestablish in Olema Marsh. Areas at higher elevations or adjacent to large sources of freshwater from creeks or groundwater would probably remain non-tidal communities such as Freshwater Marsh, Wet Meadow, and Wet Pasture or grassland.

While the project is intended to "restore" wetlands, nearly all of the Project Area is considered to be jurisdictional wetlands according to both Corps' and the California Coastal Commission's delineation standards. As part of the restoration process, there would be a small reduction in wetland area (< 2 acres) associated with creation of high tide refugia under Alternatives B -D and construction of the eastern perimeter trail under Alternatives A and B (Appendix D). Over the long-term, however, there would be a net increase in the extent of wetlands from approximately 9 acres (Alternative A) to more than 30 acres (Alternative D; Appendix D). A large majority of the riparian habitat within the Project Area is wet enough to be considered jurisdictional wetland, but in drier areas, non-wetland riparian habitat is protected by both CDFG and local streamside and bluff ordinances. Over the short term, there would actually be permanent and temporary adverse impacts to riparian habitat from fill or vegetation removal under Alternatives A-B associated with construction of the eastern perimeter trail at the base of the Point Reyes Mesa. While these impacts would total less than 1 acre, potential violation of LCP and Point Reyes Station Community Plan policies would constitute a major or substantial impact and a significant impact under CEQA. Over the long-term, however, expansion of riparian habitat throughout the Project Area would more than offset the reduction in riparian habitat associated with development of trails and would reduce impacts to minor (Alternative B) to moderate (Alternative A) under NEPA and less-than-significant under CEQA. The long-term beneficial effects to riparian habitat would be considered moderate under Alternative A and major under Alternatives B-D.

Most of the six rare species that occur or have to potential to occur in the Project Area are salt marsh or brackish marsh associates, although there are a few non-wetland species in the vicinity of the access route to the McClure DG quarry. These species include: Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*; former FSacSC; CNPS List 1B.2); Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*; former FSacSC; CNPS List 1B.2); Marin knotweed (*Polygonum marinense*; former FSacSC; CNPS List 3.1); Pacific cordgrass (*Spartina foliosa;* FSLC); salt marsh owl's-clover (*Castilleja ambigua* ssp. *ambigua;* former FSacSC); Lyngbye's sedge (*Carex lyngbyei*; CNPS List 2.2), woolly-headed spineflower

(*Chorizanthe cuspidata var. villosa*; CNPS List 1B.2), and Blasdale's bent grass (*Agrostis blasdalei*, SR; former FSacSC, CNPS List 1B.2). During construction, restoration activities would result in adverse minor impacts to salt marsh species as the work would occur during the last third of the reproduction season and could reduce seed production in areas where topsoils are scraped and stockpiled. Over the long-term, however, the action alternatives would be expected to greatly expand distribution and numbers of these species not only Tomales Bay, but -- in combination with other proposed wetland restoration projects -- throughout the San Francisco Bay region. Habitat supporting special status plant species in the Project Area would expand by approximately 300 acres under Alternative A and up to 350 acres under Alternatives B, C, and D. Based on timing of hauling and total amount of habitat impacted, hauling activities to the McClure DG quarry could have the potential for negligible to minor impacts on plants and a moderate short-term impact on habitat of these species, because topsoils would not be stockpiled and replaced. These impacts could be minimized by mitigation measures such as 1) creating a new approach for the western access route to avoid Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road.

The Project Area does not support an extensive expanse of non-native plant species considered highly invasive. Removal of invasive plant species would help to ensure successful establishment and perseverance of native vegetation communities. Effects on non-native species distribution in the Project Area would range from beneficial minor under Alternative A with a 16 percent decrease to moderate beneficial under Alternatives B, C, and D with a 30 to 39 percent decrease.

Fish and Wildlife Resources

Wildlife Habitats and General Wildlife Use

Many wildlife species within the United States have been adversely impacted by increasing urbanization; resource extraction; contamination from pesticides, metals, and other pollutants; and introduction of non-native wildlife species.

In general, wildlife habitat diversity within the Project Area is relatively high, primarily because of the mix or mosaic of habitat types occurring along and adjacent to the Project Area perimeter. While the Giacomini Ranch is largely dominated by Pasture-Grasslands, the edges of the ranch support a mix of Freshwater Marsh, Muted Tidal Brackish Marsh, Meadows, Forested and Riparian and Scrub Shrub. Many of these habitats are considered High Value Wildlife Habitats in that they support an abundance of different types of wildlife and/or high numbers of particular types of wildlife (i.e., shorebirds, waterfowl) or that they provide important breeding, nesting, or adult habitat for endangered or threatened species. Habitat diversity along the ranch's edge largely appears to result from the substantial groundwater inflow, as well as a decrease in agricultural management. Habitats are less diverse in Olema Marsh, with Freshwater Marsh and Forested and Scrub-Shrub Riparian habitats dominant, but all represent important High Value Wildlife Habitats.

While moderate to intensive development and management of the Giacomini Ranch and Olema Marsh may have caused wildlife resources to decline relative to historic conditions, the Project Area nonetheless supports a diverse array of animal species, a large proportion of which are special status because their populations are considered at risk (ARA et al. 2002). During baseline surveys, six (6) reptile, four (4) amphibian, 32 fish, and 194 bird species were observed in the Project Area (ARA et al. 2002).

As discussed earlier, the most extensive habitat change associated with the action alternatives would be conversion of non-native Pasture-Grassland to Tidal Salt and Brackish Marsh habitats. Most of the Giacomini Ranch would undergo a short-term transitional phase in which grasslands would start dying back in response to increased tidal influence and become temporarily dominated by a mix of weedy, opportunistic low-growing brackish marsh species. Under the No Action Alternative and Alternatives A and B, the extent of riparian habitat adjacent to Olema Marsh would continue to decline over the short- and long-term, with increasing water levels converting fringe areas to Freshwater Marsh. Conversely, under Alternatives C and D, dewatering and increased tidal influence within Olema Marsh would cause extensive dieback of existing Freshwater Marsh vegetation and possible colonization of weedy, opportunistic species. These transitional changes would result in negligible (No Action, Alternatives A and B) to moderate (Alternatives C and D) adverse changes to High Value Wildlife Habitats over the short-term.

Over the long-term, High Value Wildlife Habitats would expand and be enhanced as infrastructure is removed or replaced, and monotypic habitats in both the Giacomini Ranch and Olema Marsh are replaced by a more

dynamic and diverse ecosystem. As natural hydrologic processes reestablish and wetland-related habitats mature, the restored area would experience dramatic increases in the extent of High Value Wildlife Habitats, their quality, and their continuity or lack of fragmentation. Lower elevation areas in the Giacomini Ranch would convert to Tidal Salt Marsh or Tidal Brackish Marsh habitats. Higher elevation areas or areas along the perimeter would probably remain a mix of Freshwater Marsh, Meadows, and Forested and Scrub-Shrub Riparian habitats due to the decreased tidal influence and increased influence of creeks and groundwater from the Inverness Ridge and Point Reyes Mesa. Under Alternatives C and D, Freshwater Marsh and Muted Tidal Brackish Marsh would begin to reestablish within Olema Marsh as topographic, soil, and hydrologic conditions readjusted to the dramatically lower water levels. The extent of Muted Tidal Brackish Marsh in Olema Marsh could be increased by approximately 10- to 20 acres with adaptive restoration. These long-term changes would have universally beneficial effects on High Value Wildlife Habitats, ranging from minor under the No Action Alternative and moderate under Alternative A to major or substantial under Alternatives B-D. In general, High Value Habitat would increase by 350 percent relative to existing conditions under Alternative A, 390percent under Alternative B, 393 percent under Alternative C, and 396 percent under Alternative D.

The increase in High Value Wildlife Habitats would benefit the diversity and abundance of wildlife species within the Project Area, at least over the long-term. During construction, there would be potentially some adverse impacts resulting from direct or indirect disturbance to wildlife and their habitats, with effects ranging from negligible under Alternative A to minor under Alternatives B– D. Over the short-term, the discontinuation or reduction in grazing and discontinuation of agricultural management practices would have at least negligible beneficial effects on general wildlife use, although use by some species such as savannah sparrows, western meadowlarks, roosting Canada geese, and amphibians and reptiles would probably decrease. Under Alternatives C and D, the extensive die-back in vegetation associated with dewatering of Olema Marsh would offset these negligible beneficial effects to some degree, resulting in an overall minor adverse effect on general wildlife use.

Over the long-term, however, discontinuation of agricultural management, combined with the removal of aquatic and terrestrial barriers, would promote establishment of more natural ecological gradients and generally support a more diverse and possibly abundant wildlife community. The use by certain species or groups of species such as landbirds and unique freshwater-related species such as California red-legged frog (*Rana aurora draytonii*; FT) and northwestern pond turtle (*Clemmys marmorata marmorata*; former FSacSC) may decrease with conversion of pasturelands to marsh, but generally numbers and diversity of fish (including salmonids), benthic and pelagic invertebrates, shorebirds, and rare marsh passerines such as saltmarsh common yellowthroat (Ge*othlypis trichas sinuosa*; former FSacSC; CSC) and California black rails (*Laterallus jamaicensis coturniculus*; ST) would be expected to increase. The intensity of these beneficial effects would range from negligible under the No Action Alternative and minor under Alternative A to moderate under Alternatives B – D.

Over the long-term, the increase in public access facilities relative to existing conditions could increase disturbance of wildlife through causing wildlife to avoid highly trafficked areas, flushing wildlife repeatedly, and decreasing reproductive success through damage to eggs from trampling or nest abandonment (BCDC 2001). The degree of disturbance would vary depending on how much disturbance currently exists under baseline conditions. Increases in visitation with expanded pubic access facilities would be expected to have negligible to minor adverse effects on wildlife use, particularly along the White House Pool reach of Lagunitas Creek, the eastern perimeter of the Giacomini Ranch near Tomasini Creek, and the Giacomini Ranch north levee trail. Retention of the West Pasture north levee under Alternatives A and B would also have adverse impacts to special status species such as wildlife due to the fact this informal path attracts large numbers of birdwatchers during the winter and spring high tides to see California black rails: Use of the levee during high tides flushes this poor-flying bird species from one of its only upland refugias and may increase predation risk.

With any disturbance, there is the potential for invasive wildlife species to move into or expand within the Project Area. Hydrologically reconnecting or increasing the connection between the Project Area and Tomales Bay increases the potential for establishment by invasive non-native aquatic species. Because the Project Area has already been invaded, the potential for increases in the number or extent of invasive species would be considered to be minor adverse. In addition, the Project Area's proximity to rural residential areas increases the potential for feral or non-feral domestic animals to enter the Project Area and potentially have adverse effects on nesting or juvenile wildlife.

Closure of the dairy and improved water quality conditions would result in short-term negligible beneficial improvements to wildlife conditions at the watershed scale. The restoration would not only improve conditions downstream, but increase accessibility and habitat quality of the Project Area for use by marine and estuarine organisms that move up occasionally into the southern end of Tomales Bay. In the long-term, Alternative A

would be expected to have minor improvements for wildlife at the watershed scale, while improvements associated with Alternatives B, C, and D would be anticipated to be moderate.

Special Status Species

At least five (5) federally endangered and two (2) federally threatened species have historically or recently been documented in the Project Area. These species include the tidewater goby (*Eucyclogobius newberryi*; FE), central coast coho salmon (*Oncorhynchus kisutsch*; FE), California clapper rail (*Rallus longirostris obsoletus*; FE, SE), California brown pelican (*Pelecanus occidentalis californicus*; FE, SE), Least Bell's vireo (*Vireo bellii pusillus*; FE; SE); California red-legged frog (FT), and central coast steelhead salmon (*Oncorhynchus mykiss*; FT). The northwestern pond turtle is listed as a Regional Species of Concern. State-listed endangered and threatened species total at least nine, many of which were also federally listed (see above). Species that are only currently listed by the state currently include American peregrine falcon (*Falco peregrinus anatum*; SE, FD); California black rail (*Laterallus jamaicensis coturniculus*; ST), bank swallow (*Riparia riparia*; ST; former FSacSC*),* and sandhill crane (*Grus canadensis tabida*; ST).

California red-legged frog

Some of the largest remaining populations of the federally threatened California red-legged frog occur on the Point Reyes peninsula and adjacent areas. Within the Project Area, breeding populations of red-legged frog occur principally in two areas: 1) the Freshwater Marsh-Fish Hatchery Creek complex in the West Pasture and 2) Olema Marsh. There have been sporadic occurrences of adult red-legged frogs in the East Pasture, but no breeding has been documented there (Fellers and Guscio 2002).

All of the alternatives, including the No Action Alternative, would result in some level of short-term and/or long-term adverse impact to documented breeding habitat of the California red-legged frog. Under the No Action Alternative and Alternative A, the current trend of saltwater intrusion into the West Pasture freshwater marsh during extreme high tides in the winter would continue, along with conversion of the northern half of this marsh to Muted Tidal Brackish Marsh. This would result in loss of approximately 3.7 acres of red-legged frog breeding habitat. Over the short-term, impacts would probably be negligible and offset to some degree by natural Freshwater Marsh expansion with discontinuation of agricultural management. However, with deterioration of levees over the long-term, effects could increase to moderate adverse through increased intrusion of saltwater into remaining freshwater habitats.

Under Alternative B, levees and tidegates would be removed in the West Pasture, increasing tidal influence and conversion of the West Pasture freshwater marsh to brackish habitats. This would result in moderate adverse effects over the short-term through loss of another 1.5 acres of habitat, but eventual maturation of the created 5.4-acre freshwater marsh in the East Pasture Tomasini Triangle would offset these impacts over the long-term. However, long-term impacts would still be considered adverse, if negligible, because of the lack of documented breeding or established breeding habitat in the East Pasture.

Alternatives C and D would include restoration of the Olema Marsh, as well as Giacomini Ranch. The Olema Marsh restoration could have adverse impacts for red-legged frog over the short- and long-term. Over the short-term, the dramatic reduction in water levels within the currently impounded marsh would cause extensive die-back of vegetation and temporary water quality problems, thereby appreciably decreasing the marsh's suitability as breeding habitat. As the marsh readjusts to changed conditions, however, Freshwater Marsh would reestablish, however, acreage would be reduced relative to existing conditions, with conversion of approximately 10 – 20 acres to Muted Tidal Brackish Marsh because of increased tidal influence. Some of these impacts to red-legged frog would be offset by creation of up to approximately 2 acres of freshwater ponds in the adjacent Olema Creek watershed less than 0.5 miles from Olema Marsh.

Over the long-term, conditions for red-legged frog would improve as the Tomasini Triangle freshwater Marsh and Olema Creek ponds continue maturing into established marsh. (Under Alternative D, the Tomasini Triangle freshwater marsh would be slightly reduced from 5.4 to 5.2 acres.) These mitigation measures, along with other proposed habitat enhancement and creation efforts in the Seashore-owned and managed-portions of the Point Reyes Peninsula Core Area, would reduce effects of Alternatives C and D over the long-term from moderate to minor. Construction impacts, using standard BMPs, would result in negligible (No Action and Alternative A) to minor (Alternatives B – D) adverse impacts.

Tidewater goby

Until 2002, tidewater goby, a small estuarine fish species found in only a few remaining coastal watersheds in California, had not been seen in the Tomales Bay watershed since 1953. During baseline studies, however, a small population was found in the Giacomini Ranch portion of Tomasini Creek. Since then, the species has been observed in two other areas: the West Pasture Old Slough and the East Pasture Old Slough Pond. Numbers of tidewater goby have been relatively low within these areas, ranging from five (5) individuals to 50 at most (Fong 2002; NPS, unpub. data). Genetic analyses indicate that this population is genetically distinct from the nearest existing occurrences of tidewater goby at Salmon Creek Marsh and Rodeo Lagoon (Jacobs and Earl 2005). The importance of this population to species recovery is underscored by the fact that Critical Habitat was proposed in November 2006 to be expanded to include certain portions of the Giacomini Ranch, including Tomasini Creek, as well as the undiked portions of Lagunitas Creek and marshlands north of the Giacomini Ranch.

In general, the proposed project would benefit this estuarine species, with long-term effects ranging from moderate (No Action and Alternative A) to major (Alternatives B-D). These long-term benefits would result from gradual conversion of Pasture-Grassland to tidal and brackish marsh and maturation of created or naturally developing tidal creek channels within the Giacomini Ranch. In all cases, alternatives would result in expansion of tidal slough and channel habitat, allowing for brackish, low energy areas to become established. Increased hydraulic connectivity and tidal influence would also increase the potential for tidewater goby to establish in Olema Marsh. Under all alternatives, the Park Service would work with the U.S. Geological Survey (USGS) and the USFWS to conduct a captive propagation and relocation project in which these agencies would work to expand the extent of goby occurrences within the Project Area and/or southern Tomales Bay watershed.

There may be adverse effects to the goby during construction and over the short-term, because of the combination of direct impacts to existing habitat during and following construction and the fact that restored habitats would take time to establish. Under all the alternatives, the East Pasture Old Slough Pond would be hydrologically reconnected to Lagunitas Creek. Under Alternatives B – D, the West Pasture Old Slough would be hydrologically reconnected to undiked areas through removal of the Fish Hatchery creek tidegate and breaching or removal of levees. Under Alternatives C-D, Tomasini Creek would be partially or wholly realigned, respectively, into one of its historic channel alignments. Because creek realignment affects the primary population of tidewater goby in the Project Area, construction-related impacts under these alternatives are considered moderate adverse, even though construction on the current Tomasini Creek channel would be limited to berm lowering or breaching.

However, some of the direct impacts to existing habitat would be avoided by retaining the tidegate and flashboard dam structure on Tomasini Creek for at least 10- 20 years. This structure would continue to allow the full upper range of high tides into the current Tomasini Creek channel, but would truncate the lower range, maintaining subtidal or ponded almost lagoon-type conditions. Despite being almost fully tidal, salinities within this reach remain brackish even when creek flow is intermittent, because the water regime is highly influenced by seeps and groundwater flow from the Point Reyes Mesa. Under Alternatives C-D, where the Tomasini Creek is partially or wholly realigned, this created channel would be maintained as a backwater slough feature. Through the combination of the broodstock program and the dramatic expansion of habitat, all project alternatives are expected to provide moderate to major benefits over the long-term to the tidewater goby and its habitat.

Central California Coast Steelhead, Coastal California Chinook Salmon, and Central California Coast Coho Salmon

Three federally protected salmonids occur within the Lagunitas Creek watershed: steelhead (*Oncorhynchus mykiss*), chinook salmon (*O. tshawytscha*), and coho salmon (*O. kisutch*). The Lagunitas Creek watershed, including Olema Creek, is believed to support 10 to as much as 20 percent of the Central California Evolutionarily Significant Unit (CCESU) coho population (Brown et al. 1994, NPS, unpub. data).

While many salmonid projects are focused upstream on fish passage, habitat, and structure, the Project Area does not represent a potential breeding or spawning area for steelhead, coho, or Chinook salmon. These types of salmonids typically breed in the upper portions of the watershed in medium- to high-gradient tributaries. The Project Area does represent estuarine feeding habitat for outmigrating smolts, as well as a staging area for adults as they migrate upstream for spawning. However, currently, levees, culverts, and tidegates on Lagunitas, Bear Valley, Fish Hatchery, and Tomasini Creeks constrain opportunities for foraging

and refugia within -- as well as migration through -- the Project Area.

All of the action alternatives would benefit salmonid species by dramatically increasing access to potential foraging and refugia habitat. Removal of dairy infrastructure, ditches, and other materials would improve localized water quality conditions and decrease disturbance of existing aquatic habitats. Starting with Alternative B, the proposed project would also include removal or replacement of fish passage impediments or barriers to upper portions of the watersheds through eliminating the tidegate on Fish Hatchery Creek (Alternatives B-D), realigning Tomasini Creek to avoid the tidegate and flashboard dam on the current channel (Alternatives C - D), replacing the Tomasini Creek culvert at Mesa Road (Alternative D), and potentially replacing culverts on Bear Valley Creek at Levee Road and/or Bear Valley Road (Alternatives C - D). Benefits for salmonid passage and rearing conditions resulting from these restoration actions would be expected to be negligible under the No Action Alternative, minor for Alternative A, moderate for Alternative B, and major for Alternatives C-D.

In addition to rearing and passage conditions, the amount of tidal marsh available for feeding by salmonids during the 1-2 month outmigration period is important. Long-term survival of smolts is tied to their size at outmigration. Increasing the amount of area available for feeding would benefit salmonids leaving Lagunitas Creek, Olema Creek, and Bear Valley Creek, potentially enhancing their chances of survival. For Alternatives A - D, restoration would generally involve increasing the amounts of levee, culvert, and tidegate removal, as well as tidal channel creation and creek realignment, to convey flow into the interior portions of the Giacomini Ranch and Olema Marsh. Over the short-term, restoration actions would result in negligible (3 percent; No Action Alternative) to moderate increases (31 percent; Alternatives C and D) in the amount of tidal channel perimeter or total aquatic edge available for salmonids. However, as restored marshes and created tidal channels mature, benefits to salmonids would increase over the long-term, with moderate beneficial effects expected under Alternatives A and B and major beneficial effects, under Alternatives C and D. Impacts during construction would be negligible due to incorporation of standard Best Management Practices (BMPs) to limit adverse effects on creeks and other water bodies that potentially support salmonids.

California Black Rail and California Clapper Rail

Early in the 20th century, California black rails (ST) were apparently very common in the tidal marshes near Point Reyes Station, and California clapper rails (FE, SE) also reportedly occurred in Tomales Bay (Grinnell and Miller 1944). However, these species have been negatively impacted by large-scale habitat loss of coastal wetlands in California, as well as local losses of wetlands in Tomales Bay.

In 1994, the undiked marsh north of the Giacomini Ranch supported at least seven (7) pairs of breeding California black rails (Evens and Page 1986; Evens and Nur 2002), and black rails have also been detected intermittently in Olema and Bear Valley Marshes (ARA et al. 2002). There is no recent information on the number of breeding pairs of black rails, although numbers have possibly decreased (J. Evens, ARA, *pers. comm.).* Clapper rails are even less common in Tomales Bay. Clapper rail individuals were sighted for several years in the undiked marsh north of the Giacomini Ranch between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). However, there are no recent breeding records for this species in Tomales Bay (ARA 2002).

The proposed project has opportunities to expand breeding and foraging habitat for rails with breaching or removal of levees, expansion of tidal and brackish marsh habitats, and potentially a decrease in water impoundment within Olema Marsh. Over the short-term, these changes would result in negligible beneficial effects on rails, because vegetation communities would be in a transitional phase marked by extensive vegetation dieback and temporary establishment by weedy, opportunistic species. However, over the long-term, establishment or reestablishment of Tidal Salt Marsh and Tidal Brackish Marsh would benefit rails, with effects ranging from minor under the No Action Alternative (~11 acres) to major under Alternatives A-D (~ 250 to 350 acres). Construction would have the potential to have negligible (No Action and Alternative A) to moderate (Alternatives B-D) adverse effects on rails, although standard construction BMPs involving pre-construction surveys and delays of construction near breeding habitat during the spring and summer would be observed.

In addition to breeding and foraging habitat, another important habitat for rails is high tide refugia, which is typically higher elevation upland or upland ecotone areas. Currently, rails near the Giacomini Ranch use the levee system as refugia. Under all alternatives, some portion of levees would be retained both in the West and East Pasture for high tide refugia. While levee loss could be perceived as adverse, the quality of the levees as refugia could be considered somewhat reduced relative to optimal refugia conditions, because vegetation cover is somewhat poor, and use of the existing informal path by birdwatchers during extreme high

tides increases disturbance. In 2006, the Park Service conducted an enhancement project to widen and improve habitat conditions along one section of the West Pasture levee near the undiked marsh, the rail's existing habitat. The Tomasini Creek levee would also remain, providing refugia for rails possibly establishing in the East Pasture. Upland areas would also exist along the Project Area perimeter and in the southern portions of the two pastures: these southern upland areas would become more viable as refugia habitat with discontinuation of agricultural management and expansion of marsh habitat southward into the interior of the two pastures.

Other Special Status Species

Most of the other federally and state-listed endangered and threatened species are only occasional visitors or vagrants to the Project Area, with the exception of peregrine falcon, a state endangered species and federally delisted species that has been regularly observed foraging over the Giacomini Ranch.

Species analyzed in this section include California freshwater shrimp (*Syncaris pacifica*, FE; common upstream in freshwater portions of Lagunitas Creek, rare in Project Area); California brown pelican (*Pelicanus occidentalis californicus*, FE; foraging on Lagunitas Creek shoreline); Least Bell's vireo (*Vireo bellii pusillus*, FE, SE; extremely rare vagrant in riparian habitat); green sturgeon (*Acipenser medirostris*, FT; forages rarely in Lagunitas Creek); peregrine falcon (*Falco peregrinus*, SE; regularly observed foraging over the Giacomini Ranch and undiked marsh); sandhill crane (*Grus canadensis*, ST; very rare visitor to wet pastures in Giacomini Ranch); and bank swallow (*Riparia riparia,* ST; rare transient over Giacomini Ranch in fall). In addition, analysis also includes species that are not federally or state-listed as endangered or threatened, but that were until recently listed as species of concern by the regional USFWS office (FSacSC) and are known to occur in the Project Area. These species include: northwestern pond turtle (*Clemmys marmorata marmorata*, former FSacSC) and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa,* former FSacSC).

The impacts of restoration and/or public access actions would vary depending upon the species. Most species would experience negligible to minor adverse effects during construction due to noise and habitat disturbances caused directly and indirectly by earthmoving activities. The northwestern pond turtle would suffer moderate adverse impacts as the pasture ditches and freshwater areas they currently use are filled or converted into brackish or saline creeks through reintroduction of tides. Saltmarsh common yellowthroat, which breeds in riparian habitat along the Project Area perimeter, could be adversely impacted by permanent or temporary removal of riparian habitat for construction of the eastern perimeter trail, southern perimeter trail, and the possible future extension of the southern perimeter trail to Inverness Park. Impacts would be reduced under Alternatives C and D, because there is no through-trail component on the eastern and/or southern perimeter. One species that could actually benefit from construction would be the peregrine falcon, which would likely find greater prey availability during this period due to ground disturbance.

Over the short- and long-term, discontinuation of agricultural management practices such as levee maintenance, freshwater diversions, operation of tidegates, ditching, and grazing would negligibly benefit a number of species, including saltmarsh common yellowthroat, southwestern river otter, California brown pelican, green sturgeon, and Least Bell's vireo. In general, the California freshwater shrimp would benefit under the No Action Alternative and Alternatives A and B from the discontinuation of agricultural management such as levee maintenance and diversion of Lagunitas Creek water from irrigation. However, under Alternatives C and D, there would potentially be a minor adverse effect on shrimp due to increased salinities in upstream portions of Lagunitas Creek because of increased tidal prism in Olema Marsh and connectivity to Lagunitas Creek.

In addition, under most action alternatives, negligible to moderate adverse effects would be expected over the long-term for certain freshwater- and grassland-associated special status species. While "flushing" of voles and other rodents may benefit the American peregrine falcon during construction, over the long-term, loss of grassland habitat would reduce rodent numbers and have a negligible adverse effect on this raptor. Species such as sandhill crane and bank swallow may also respond negatively to grassland conversion.

Cultural Resources

Since the early 1900s, a number of laws and policies have been enacted to protect cultural resources. These laws require project proponents to evaluate impacts of proposed projects to archaeological and historic structure resources. Surveys of the Giacomini Ranch in 2002 identified two previously unrecorded cultural landscape features: a portion of the North Pacific Coast Railroad grade (ASC-69/01-01) and a historic-period levee system and dam (ASC-69/01-02; Newland 2003). The dam was a temporary gravel dam that the

Giacominis installed each summer to provide freshwater for irrigation purposes, however, installation was discontinued in 1998 prior to selling the property to the Park Service. While the original levee system was constructed more than 50 years ago, frequent repairs and reinforcement (e.g., rip-rap) has reduces its value as a historic resource (Mark Rudo, Park Service, *pers. comm*.). In 2004, four additional landscape features were recorded by Garcia and Associates (2004): two manure lagoons and two corrals in the main complex. The corrals are not on Park Service property.

Overall, all action alternatives would result in minor adverse impacts to cultural resources associated with activities affecting the recorded landscape features (e.g. manure lagoons and corrals). None of the features recorded was deemed eligible for listing in the National Register of Historic Places (Newland 2003, Garcia and Associates 2004), so the proposed project would have no impacts on historic properties. In terms of cultural landscape features, under Alternatives A-D, the manure lagoons would be filled, and some or all of the levees would removed, with the amount of levee removal increasing under each of the alternatives. The portion of the North Pacific Coast Railroad grade in the Project Area would be used for the eastern perimeter through-trail under Alternatives A and B and one or more spur trails under Alternatives C and D: construction of these trails would not be anticipated to compromise the integrity of this feature.

Public Health and Safety – Flooding

Flood-related federal and local regulations focus on reducing both the exposure of communities and parks to damaging flooding and the funds required to rebuild communities and parks following such major floods (Clearwater Hydrology and Nichols-Berman 2002). The National Flood Insurance Act of 1968 and the Flood Disaster Prevention Act of 1973 established the National Flood Insurance Program (NFIP) for insuring properties in designated 100- and 500-year flood zones (Clearwater Hydrology and Nichols Berman 2002). Situated in an alluvial valley at the confluence of several creeks, the entire Project Area falls within a designated 100-year flood hazard zone (Clearwater Hydrology and Nichols-Berman 2002). Over the last century, a number of catastrophic floods and rainfall-induced landslides have caused extensive damage to homes, ranches, and roads in west Marin. The largest recorded flood in the Project Area and vicinity was the 1982 storm, a 100-year flood event that triggered 18,000 slides, damaged 100 homes, and killed 14 people (Ellen et al. 1988).

Computer hydraulic modeling (KHE 2006a) and topographic information (USGS 2003b) were used to evaluate the potential for any increases in flooding of structures or decreases in the ability of residents to leave homes due to flooding of driveways or roads or the ability of emergency personnel to reach residents needing emergency services. The analysis focused on changes in vertical flood elevations or flood height for the 2- to 100-year flood events. Changes in vertical flood elevation and associated risk to public health and safety were analyzed for three separate areas within or adjacent to the Project Area that are prone to flooding: 1) East Levee Road and properties and homes along Levee Road; 2) West Levee Road adjacent to White House Pool County Park and Olema Marsh, and 3) Sir Francis Drake Boulevard in Inverness Park and properties and homes on the east side of the road contiguous with the Giacomini Ranch West Pasture. In addition, changes in vertical flood elevations were also assessed for properties north of the Project Area towards Inverness.

Hydrologic investigations and modeling conducted as part of baseline studies indicate that the height of the Giacomini Ranch East Pasture levees east of the old summer dam location is higher than the opposite creek bank where Levee Road homes are located (KHE 2006a). This disparity in levee and creek bank height directs flood flows toward the homes (KHE 2006a). Properties on the eastern end of Levee Road directly south of the Giacomini Ranch East Pasture are frequently flooded by Lagunitas Creek. On average, flood flows overtop the southern bank of Lagunitas Creek during 3-year flood events, while the Giacomini Ranch levee opposite Levee Road overtops, on average, between 3.5-year and >10-year flood events (KHE 2006a). Levee breaching or removal would generally relieve flood pressure on Levee Road and Levee Road residences during more frequent flood events. Under all flood scenarios (2-100 –year flood event), there would be a measurable or minor reduction in water level on the eastern, developed portion of Levee Road relative to baseline conditions. This reduction would not prevent flooding, but would result in reductions in water level or vertical flood elevations with respect to baseline conditions and increase public health and safety.

The undeveloped western portion of Levee Road adjacent to Olema Marsh is the lowest topographically and floods consistently during even low magnitude storms, resulting in frequent road closures. Levee Road serves as one of only two county roads that provide access to the communities of Inverness Park, Inverness, and the remainder of the Point Reyes Peninsula. The effects of the proposed project on the frequency of Levee Road closure would be substantial, with alternatives expected to reduce flooding during certain flood events by as much as 0.9 feet under Alternative A (moderate beneficial) to as much as 1.1 feet under Alternatives B-D

(moderate/major beneficial). The southern perimeter through-trail proposed under Alternatives A-C would include a bridge across Lagunitas Creek at the general location of the old summer dam. Because flood flows would drop considerably in this portion of Lagunitas Creek with restoration, elevation of the bridge would only need to exceed 16- to 17- feet NAVD88 to allow for conveyance of 10-year flood flows and 18.2- to 19.2 feet NAVD88 to allow for conveyance of the 50- and 100-year flood flows (KHE 2006a). These elevations include the 1- to 2-feet additional vertical feet of height that would be needed to provide some freeboard. The bridge and other public access facilities would not be expected to impede flood flows or exacerbate flooding.

The four closest homes to the Project Area are those along Sir Francis Drake Boulevard that are contiguous with the Giacomini Ranch West Pasture. Hydraulic modeling suggests that, under the 2- to 100-year flood event scenarios, there would be no change from existing conditions under the No Action Alternative and Alternative A in which the West Pasture is not restored. Under existing conditions, the West Pasture levees keep Lagunitas Creek waters more than 1,000 feet to the east under flood events smaller than the 12-year event, at which point levees overtop. Hydraulic modeling indicate that the four residences on the east side of Sir Francis Drake Boulevard are not impacted by rising waters from Lagunitas Creek during any of the simulated flood events (5-, 10-, 50-, and 100-year), except for potentially the 500-year flood event (KHE 2006a). During large rainfall events, most properties are subject more to flooding from the smaller Inverness Ridge drainages that flow down the ridge and out into the West Pasture. These tributaries often deposit large amounts of sediment that increase flood water stage or vertical flood elevation and cause back-up of floodwaters onto properties (KHE 2006a).

Starting with Alternative B, the frequency of levee overtopping in the West Pasture would increase from 12-year flood events to 2-year flood events (KHE 2006a). Hydraulic modeling indicates that, under Alternative B, because levees in the southern portion of the pasture would not be completely removed, but outflow of waters would be increased by removal of the West Pasture north levee and Fish Hatchery Creek tidegate, vertical flood elevations in the West Pasture would decrease by as much as 0.4 feet under 2- to 10-year flood events (KHE 2006a). However, during 2- to 50-year flood events under Alternatives C and D, where levees are completely removed, vertical flood elevations in the West Pasture could increase by as much as 0.3 to 1.6 feet (KHE 2006a). These increases in vertical flood elevation under the 2- to 50-year flood events would cause increased flooding of the lower undeveloped portions of properties (KHE 2006a), but would not affect homes, driveways, or access routes to roads. The four developed homes are at least 4- to 7 feet higher than the elevation of the West Pasture levee, because they have been built on alluvial fans or small hills created by episodic sediment deposition from Inverness Ridge creeks over time. Because flooding would not affect public health and safety, adverse changes to public health and safety under Alternatives B – C are characterized as minor to moderate.

One of the potential mitigation measures for reducing impacts to private properties would be to construct levee or berms on the property perimeter, particularly for some of the lower elevation homes or developed properties or portions of properties. However, levee construction would be complicated by the presence of the Inverness Ridge drainages, as levees could increase impoundment of waters westward of the levee. As discussed earlier, baseline studies point to the primary flood risk for many of these properties and portions of Sir Francis Drake Boulevard in Inverness Park being the drainages that flow off the Inverness Ridge.

Public Health and Safety – Disease and Public Health

One of the strongest concerns currently about wetlands and public health is the rapid spread of West Nile Virus. While the reservoir host for this virus is considered to be birds, it can be transmitted by mosquitoes. Unlike malaria and dengue fever, which is carried by only one type or genus of mosquito, several genera – a total of 44 species within all genera -- can carry West Nile, many of which also carry other mosquito-borne diseases, as well, including encephalitis and malaria. Because of concerns regarding West Nile, the western portion of Marin County was annexed into the Marin-Sonoma Mosquito and Vector Control District (District) in 2005.

Under baseline conditions, infrastructure (e.g., levees, culverts, tidegates) or management practices have increased potential mosquito breeding habitat in the Giacomini Ranch and Olema Marsh by 1) creating water impoundments that lead to stagnant water conditions; and 2) increasing the duration and extent of ponding or inundation.

All of the alternatives would have minor (No Action Alternative) to moderate (Alternatives A-D) beneficial effects on reducing populations and breeding habitats for mosquitoes. The No Action Alternative would eliminate agricultural management practices such as spray and flood irrigation, ditching, and other activities

that could promote mosquitoes, while all of the action alternatives would involve varying degrees of infrastructure removal, including filling in of ditches and manure ponds, breaching and/or removal of levees, and tidegate removal. Also, new tidal channels would be created, thereby expanding tidal flooding and exchange through much of the East Pasture (Alternatives A-D) and West Pasture (Alternatives B-D). There is a potential for minor adverse effects on the extent of mosquito breeding habitat under Alternatives A-D during construction and over the short-term following restoration, because restoration may require temporary installation of water impoundment or bypass features such as coffer dams.

Removal of agricultural management and restoration would also lead to a change in habitats. Some of the habitats with higher potential for providing optimal mosquito breeding conditions include muted tidal and non-tidal open water channels and ponds, as well as vegetated habitats, that are permanently, seasonally, or temporarily flooded. Through restoration, a large proportion of the Project Area would convert to Tidal Salt or Brackish Marsh habitats. Conditions in fully tidal systems are often less favorable for mosquito breeding, because strong tidal currents disrupt egg laying in channels and adjacent vegetated habitats that are inundated daily, as well as provide habitat for the natural predators of mosquitoes and reduce flooding in areas that are not normally wet (IWCP 2001). In San Francisco Bay, full tidal action has been shown to decrease mosquito numbers by as much as 98.7 percent relative to either pre-restoration conditions (Kramer et al. 1995) or adjacent impounded marshes (Liu 2001). Within the Project Area, the extent of habitat with the highest potential for supporting breeding mosquitoes would decrease by 60 percent under Alternative A, 75 percent under Alternative B, 80 percent under Alternative C, and 83 percent under Alternative D.

Portions of mid-marsh "zones" or marshplains or sluggish portions of tidal creeks that are not regularly inundated by tides, but receive infrequent tidal inundation, may continue to provide breeding habitat for mosquitoes, particularly saltmarsh mosquitoes such as *Ochlerotatus squamiger*. While *O. squamiger* is known to transmit certain strains of encephalitis, it is not a documented carrier of West Nile Virus. Overall, the proposed activities under all action alternatives would be expected to reduce numbers of mosquitoes that may act as disease vectors through reintroduction of tidal flushing, conversion of a significant portion of the Giacomini Ranch to Tidal Salt Marsh, and discontinuation of agricultural management practices such as ditching, irrigation, and maintenance of tidegates and manure ponds.

Public Services – Municipal Water Supply and Distribution

Federal and state regulations and policies protect both the supply and quality of drinking water for the public. The California Safe Drinking Water Act (CA SDWA) was passed to build on and strengthen the federal SDWA. Within California, the authority for implementation of the SDWA has been delegated to the California Department of Health Services (DHS). USEPA and DHS recently established disinfection by-product levels in potable water as a primary drinking water standard. In addition to strengthening primary standards through the CA SDWA, DHS has also set secondary drinking water standards and maximum contaminant levels for analytes or contaminants of lesser concern that affect the taste, odor, or appearance of drinking water such as salts or chlorides.

The Project Area is located within the North Marin Water District (NMWD) West Marin Service Territory. Within the West Marin area, NMWD services the towns of Point Reyes Station, Olema, Bear Valley, Inverness Park, and Paradise Ranch Estates. Currently, NMWD currently obtains its water supply for the West Marin service area from two wells located adjacent to Lagunitas Creek on the U.S. Coast Guard (USCG) property in Point Reyes Station. Freshwater flow on Lagunitas Creek, which flows through the Project Area, is largely controlled, by five dams operated by the Marin Municipal Water District (MMWD), which services most of the rest of eastern Marin County. NMWD has two other active wells that it has developed – the Downey Well and the Gallagher Well. Located upstream of the Coast Guard wells, the Downey Well is no longer used for municipal water supply, although up to approximately 1.23 cfs of water can be pumped from this well during the summer to the Giacomini Ranch for irrigation purposes as part of NMWD's agreement with the Giacomini family, which retains the appropriative rights for up to 2 cfs.

Currently, the NMWD faces problems with occasional intrusion of salts or chlorides into the Coast Guard wells, although institution of management practices such as off-tide pumping have appeared to decrease frequency of these events. Water districts are required by law to provide safe drinking water for customers. DHS recently established primary drinking water standards for disinfection by-products such as chlorites (MCL = 1.0 mg/L). DHS has established secondary drinking water standards for chloride in potable water ranging from 250 (recommended) to 500 (maximum) mg/L, however, NMWD has instituted stricter standards of 100 mg/L, which is often at the lower range of what people can discern by taste.

While there has been a considerable amount of study into the salinity intrusion problem, the exact cause or mechanisms by which salinities become elevated is still not totally understood. However, salinity intrusion appears to be controlled by a combination of factors, including tidal height, streamflow discharge, pumping rates, and possible influence from the adjacent terrace groundwater aquifer (KHE 2006a). Salinity intrusion events appear to correlate with low creek flows of less than 9-10 cfs; maximum well-pumping rates; and spring tides exceeding 5.5 - to 5.7 feet MLLW and often lag behind spring or high tide events by as much as 5- 7 days. While the exact location at which tidally and non-tidally influenced surface waters infiltrate into the alluvial aquifer is unknown, several factors -- including stratigraphy and creek bathymetry in the vicinity of the Coast Guard wells; predicted tide "thresholds" at which increases in groundwater salinity occur, and the consistent 5- to 7-day lag time between high tide and salinity intrusion events -- point to the infiltration location being some distance upstream from the Coast Guard wells (KHE 2006a).

Restoration and management actions that would most affect surface water salinities in the upper portion of Lagunitas Creek near the Coast Guard Well site would appear to be: 1) the proposed conversion of the Giacomini appropriative water right use dedication from irrigation to beneficial in-stream uses and 2) the proposed adaptive restoration component for Olema Marsh. Under all alternatives, the Park Service would dedicate the 2.0 cfs appropriative water right that it purchased and that the Giacominis have been using for irrigation of the East Pasture to beneficial instream uses, which would increase the amount of downstream freshwater flow by 20 percent during the summer and early fall months. Modeling (KHE 2006a) shows that discontinuation of irrigation under the No Action Alternative would reduce average salinity or chloride concentrations in the portion of Lagunitas Creek upstream of the Green Bridge during spring or high tide conditions (predicted Inverness tides > 5.5 ft MLLW) by as much as 37 percent under dry-year streamflows (6 cfs) and 40 percent under normal-year streamflows (8 cfs) relative to baseline conditions (KHE 2006a). Dry-year flow conditions also assume minimal inflow from tributaries to Lagunitas Creek, including Olema and Bear Valley Creek. These changes in creek salinities could have moderate beneficial effects on municipal water supply operations by potentially decreasing the duration of off-tide pumping during high tide events and the amount of time needed after a high-tide event for freshwater recharge to reduce chlorides in the alluvial aquifer. In addition, it could possibly decrease the frequency of salinity intrusion events by increasing the tide-related threshold (>5.5 – 5.7 ft MLLW) at which monitoring of salinities in the wells begin to show evidence of increased chlorides.

Alternatives A and B would result in a slightly lower percent reduction in average salinity or chloride concentrations during spring or high tide conditions under both normal-year and dry-year streamflow conditions. The percent reduction would be decreased to 14 percent (moderate beneficial) under both normal-year and dry-year streamflow conditions, because the increase in hydrologically connected tidal marsh in the Giacomini Ranch would generally increase the tidal prism and, therefore, the salt mass or total volume of salts in the Project Area. However, most of the tidal exchange in the Giacomini Ranch would occur within the lower-elevation northern portion of the East Pasture, where marshplain elevations are lowest, and the primary tidal creek inlet would be located. These areas are almost 2- 2.75 miles downstream of the Coast Guard wells.

Average salinities during spring or high tide and normal streamflow conditions would actually increase by as much as 27- to 32 percent in upstream portions of Lagunitas Creek under Alternatives C-D during dry-year and normal-year streamflow conditions, respectively. This increase in salinities appears to relate to the increase in tidal prism in Olema Marsh with restoration and exchange of tidally influenced or higher salinity waters between the marsh and Lagunitas Creek. While the potential tidal prism or volume of waters is much smaller in Olema Marsh than that of the Giacomini Ranch, the point at which these waters would be exchanged with Lagunitas Creek is much closer to the Coast Guard wells and is located in a deep, pooled section of Lagunitas Creek that potentially has greater exchange with reaches upstream of the Green Bridge.

While chloride concentrations may increase relative to existing conditions, Alternatives C and D would not increase the frequency or duration of events conveying saline waters upstream of the Green Bridge, because the current thresholds of 5.5- to 5.7 feet MLLW at which chloride concentrations start increasing within the groundwater well system appear to be related more to tidal waters reaching a specific location within the creek where infiltration occurs than to a critical chloride volume. Regardless, Alternatives C and D would appear to have the potential for major or substantial adverse effects on municipal water supply operations by increasing the need for -- and potentially the duration of -- off-tide pumping required to preclude or minimize infiltration of chlorides into the alluvial aquifer. These major or substantial adverse impacts would be mitigated to at least minor under NEPA and less-than-significant under CEQA by not implementing major adaptive restoration elements in Olema Marsh until 1) further monitoring and modeling show that elevated salinities would not pose a threat to water supply operations or that restoration in Olema Marsh would not elevate salinities in upstream portions of Lagunitas Creek or 2) NMWD receives funding and moves ahead with

construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. The major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts. Through iterative hydrodynamic modeling runs, the Park Service, ACR, and CSLC would work with its hydrologic consultants to identify limited restoration actions that could be implemented without causing potentially more than minor impacts to upstream Lagunitas Creek salinities and NMWD operations.

As it has done throughout the planning process, the Park Service will continue to work cooperatively with NMWD in trying to gain a better understanding of the dynamics of this complex hydrologic system and to support NMWD in its efforts to develop increased water supply reliability through development of the Gallagher well or other options that would increasing water supply reliability to the to the West Marin Service Area.

Public Services – Wastewater Treatment and Disposal

The urban area of Marin County is unique in the way that it deals with its sewage disposal (Marin County Grand Jury 2003). In other urban areas, either cities/towns provide sewage collection and treatment (San Francisco), or a large agency provides these services for several cities and towns (East Bay Municipal Utility District; Marin County Grand Jury 2003). In the urban area of Marin, more than 19 different sewer districts or agencies carry out this function (Marin County Grand Jury 2003), and many homes in unincorporated areas of the county such as West Marin or even some within town limits are on individual sewage disposal systems that are located on-site, including septic tank and leach field systems, holding tanks, and seepage pits.

The State of California regulates on-site disposal systems through the State Water Resources Control Board (SWRCB) and its districts, such as the San Francisco Regional Water Quality Control Board (RWQCB). In Marin County, the RWQCB has ceded its authority over regulation of on-site treatment systems to the County. County Code 18.06 requires that requires that construction of individual wastewater treatment systems be permitted and that individual septic systems be inspected every two years. The Code prohibits construction, use, or maintenance of any component of an individual wastewater treatment system that is injurious to the public health and welfare or that is operated "in such a manner as to overflow onto public or private land or affect any river, stream, creek, spring, lake, pond, reservoir, swamp, ocean, bay, water supply, or water system."

Many of the on-site wastewater treatment systems within the Tomales Bay watershed are operating under marginal conditions due to poor soil conditions, the proximity of these systems to existing surface water and groundwater discharges, or location within an active flood zone. DHS found that, of approximately 1,600 parcels in the Tomales Bay region assumed to have on-site disposal systems, all have poor soils for septic absorption fields as determined by USDA (DHS 2001 *in* RWQCB 2005). In addition, the majority of the parcels lack sufficient available land to install an on-site disposal system that meets the required sanitary setbacks and construction standards (DHS 2001 *in* RWQCB 2005).

The proposed project is unlikely to affect on-site wastewater disposal systems adjoining the East Pasture, because these parcels are approximately 30- to 50- feet above the surrounding grade of the East Pasture, however, there are at least four (4) properties that directly adjoin the West Pasture that have on-site wastewater disposal systems.

Because there would be no restoration of the West Pasture under the No Action Alternative and Alternative A, these alternatives would generally have no effect on on-site wastewater disposal treatment systems adjacent to the West Pasture of the Giacomini Ranch. However, should levees degrade over the long-term, there could be an increase in tidal and freshwater hydrologic processes – and impacts -- similar to that expected under Alternatives B-D. An increase in tidal exchange with Lagunitas Creek with levee degradation would not be expected to affect systems, at least over the short-term, because tides (Mean Higher High Water or higher high tide event in West Pasture = 5.78 feet NAVD88; KHE 2006a) would not reach the elevations of the homes and septic systems (~8- to 14 feet NAVD88). All of these parcels are situated on alluvial fans or deposition of sediments conveyed downstream and deposited on the perimeter of the West Pasture by the numerous drainages that flow off of the Inverness Ridge.

However, vertical flood elevations could increase as much as 1.6 foot under the 50-year flood event (KHE 2006a). Based on modeling results, this increase would not be expected to affect homes or the areas where on-site wastewater treatment systems are located. During storms, homes and on-site wastewater treatment disposal locations are more likely to be flooded by drainages and groundwater from the Inverness Ridge than by Lagunitas Creek. Two (2) of the four (4) properties adjoining the West Pasture with on-site wastewater

disposal systems are located within 100 feet of a stream, and a third is located within 100- to 500 feet of a stream. These parcels are subject to regular flooding by these creeks under even small- to medium stormflow events and also fall within the 100-year floodplain for Lagunitas Creek. These surface water flows are supplemented by copious amounts of groundwater that emerge from the base of the Inverness Ridge along many portions of the Project Area and either sheetflow across the pasture or travel sub-surface in a shallow water table (KHE 2006a), which lies anywhere from approximately 3 – to 9 feet below the ground surface in areas adjacent to homes.

While flood peaks in the West Pasture would increase, the duration of flooding would decrease, because erosion or removal of the levee would allow floodwaters to flow out of the pasture and into Lagunitas Creek more quickly (G. Kamman, KHE, *pers. comm*.). In addition, under Alternatives B-D, removal of the West Pasture's north levee and the tidegate would decrease water levels during non-storm periods by as much as 0.4 feet within the West Pasture (KHE 2006a). A decrease in water levels both after storms and during non-storm periods would effectively lower local groundwater levels (KHE 2006a). Lowering of the water table in the West Pasture could actually improve efficacy of treatment systems (G. Kamman, KHE, *pers. comm*.) and decrease the potential for -- or length of time during which -- these systems could pose risks to public health and welfare or to aquatic resources through discharge to surface waters entering Lagunitas Creek and eventually Tomales Bay. Therefore, at the very most, Alternatives B-D would potentially have a negligible adverse effect because of the increase in flooding from Lagunitas Creek over the short-term and immediate long-term, with impacts possibly increasing to minor over the long-term should sea-level rise increase mean tide levels.

Public Services - Traffic and Transportation

Most of the transportation routes within or directly adjacent to the Project Area are county roads, with the exception of State Route 1. The Marin County Congestion Management Agency (CMA) creates, updates, and administers a Congestion Management Plan (CMP) for all types of roadways within the county. The purpose of the CMP is to establish Levels of Service (LOS) for designated freeways, state highways, and local arterial roads and to maintain those standards by increasing capacity or managing travel demand on those roads. The County has established a minimum LOS for urban and suburban arterials, including highways that serve as arterials such as State Route 1, as LOS D or better and LOS E or better for major highways and rural expressways, with LOS E being the most impacted or congested. Although standards for rural roads are not clearly specified, for the purposes of this analysis, Sir Francis Drake Boulevard (including Levee Road), Bear Valley Road, and Pierce Point Road would be interpreted as needing to meet LOS standards of D or better.

The proposed project could affect traffic by increasing the number of vehicles and trucks on local roadways not only during construction, but after construction through increases in visitation to the restored wetland. In 1998, BRW and Lee Engineering (1998) projected that, based on 1 percent annual growth in visitation and traffic , LOS would not change for Project Area roadways such as State Route 1, Sir Francis Drake Boulevard (Olema – Pierce Point Road), or Bear Valley Road between 1998 and 2010 (BRW and Lee Engineering 1998). However, since 1998, park visitation has actually declined, with visitor numbers 28 percent lower (or 761,415 fewer annual visitors) in 2005 than those projected by BRW and Lee Engineering. Because of this decline in park and regional visitation, most of the local and regional roadways appear to be operating at a LOS of B or C currently, an improvement since 1998 when several roads such as Bear Valley had high enough traffic levels to be rated as operating at a Level D LOS (BRW and Lee Engineering 1998). Based on this information, alternatives should be able to generate as many 2,504 additional daily visitors or 650 cars or vehicle trips (assuming 4-person occupancy) through 2010 without causing any change in LOS for roadways and/or causing a drop in LOS below LOS D, the county's minimum standard.

Most of the construction-related traffic effects would come from hauling of excavated sediment from the Project Area to local quarries. Truck traffic on local and regional roadways would result in negligible impacts under the No Action Alternative, negligible-minor impacts under Alternative A, minor impacts under Alternative B, and minor-moderate impacts under Alternatives C and D. The potentially most noticeable changes in traffic patterns related to hauling would occur on Levee Road and the eastern portion of Sir Francis Drake Boulevard and Pierce Point Road on the Point Reyes Peninsula, although effects would still be characterized as minor. Temporary road closures under Alternatives C and D during culvert replacement activities could cause moderate impacts on two roads (Levee, Bear Valley, and Mesa Roads) that are important arterial or access routes for residents, visitors, and/or Park Service staff on the Point Reyes Peninsula. Under the other alternatives, traffic control would be expected to have no more than a minor adverse effect on Levee Road and Sir Francis Drake Boulevard during installation of the prefabricated bridge, mobilization/demobilization of construction equipment in the West Pasture, and entry and exit of hauling

trucks into the West Pasture. Some of these impacts could be compounded by other proposed projects within the Project Area, including the Sir Francis Drake Boulevard Repaving Project and County of Marin Culvert Cleaning Project on Levee Road near Olema Marsh.

Increases in visitation to the restored wetland could alter local traffic patterns and parking demand. The No Action Alternative would have only a negligible effect on traffic and parking demand in the local community, because there would be no construction or enhancement of public access facilities and only very minimal wetland restoration. Alternatives A – C would also generally have negligible effects on traffic in the local community, although impacts within specific areas such as the western portion of Point Reyes Station near C Street and Mesa Road in the Point Reyes Mesa area would be characterized as minor due to the presence of trailheads in these areas.

Under Alternatives A and B, the existing trailhead for the Giacomini Ranch East Pasture informal trail near 3rd and C Streets in Point Reyes Station would be retained and incorporated into the southern perimeter trail, but visitor and resident trail use and associated traffic and parking demand would be expected to increase relative to existing or baseline conditions, resulting in measurable effects on traffic and potentially appreciable effects on parking demand in this and other areas in Point Reyes Station. The recently updated Point Reyes Station Community Plan (Marin County Community Development Agency 2001) focused on the lack of off-street parking in Point Reyes Station as a concern, given the steady increase in numbers of visitors and area residents. Off-street parking would be available at the western end of the southern perimeter trail at the White House Pool County Park lot (approximately 43 parking spaces). Under Alternative C, the Point Reyes Station trailhead location for the southern perimeter through trail would be relocated to near the Green Bridge, although there would still be a trailhead off of Mesa Road for the Mesa Road spur trail. Under Alternative D, impacts on traffic and parking demand would be reduced to negligible, because of considerable scaling back of public access facilities (e.g., elimination of through- trail component on southern perimeter) and elimination of trailhead locations at 3rd and C Streets and on Mesa Road.

The through-trail components in Alternatives A, B, and C would result in minor to moderate beneficial effects on alternative modes of transportation. The Point Reyes Station Community Plan (2001) supports efforts to reduce congestion through alternative transportation, including efforts to identify appropriate locations for paths that could be used for both bicycle commuting and recreation, including investigations into the feasibility of using the abandoned railroad right-of-way. Under Alternatives A-C, the southern perimeter trail would provide a more direct connection between the western and eastern sides of Tomales Bay with a bridge between White House Pool County park and the Giacomini Ranch East Pasture. These alternatives also incorporate the potential for future collaboration with the county on a possible extension of the southern perimeter trail to Inverness Park at a later time, once technical problems regarding road deterioration have been addressed. The eastern perimeter trail would provide connected access from Point Reyes Station north to State Route 1 under Alternatives A-B, but would not provide through access under Alternatives C-D. Because of this, Alternatives A and B would offer more appreciable benefits (moderate beneficial) for alternative transportation opportunities than Alternative C (minor beneficial). Alternative D would have even fewer benefits (negligible beneficial), because neither the eastern or southern perimeter spur trails proposed would connect through to Point Reyes Station, although the Park Service would commit to working in the future with the County of Marin on expanding public access facilities on the southern perimeter of the Project Area that could increase through-trail connectivity and benefits to alternative transportation.

Visitor and Resident Experience – Public Access Resources

For the Park Service, "providing opportunities for appropriate public enjoyment is an important part of the Service's mission" (NPS 2006, Section 8.1). From the Park Service perspective, public education and enjoyment can be integral components of the wetland restoration process such that it can enhance "natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions" (NPS 2006, Section 4.6.5). In terms of public access resources, the proposed project can either benefit or impact public access resources and public safety conditions by constructing new trails and facilities or enhancing or eliminating existing ones. Construction also has the potential to temporarily affect the visitor and resident experience by limiting or increasing the difficulty of access to public access facilities in the Project Area and other areas of the park, disrupting the subjective quality of the visitor and resident experience, or decreasing public safety.

Less earthmoving and a shorter construction period under the No Action Alternative and Alternatives A-B would mean fewer potential impacts to visitors and residents in terms of accessing existing public access facilities or disrupting the subjective quality of the visitor or resident experience than under Alternatives C-D.

In addition, under Alternatives C and D, temporary road closures on important arterial roads such as Levee and Bear Valley Roads associated with restoration of Olema Marsh could increase impacts to visitors and residents, because these roads provide access to public access facilities on the Point Reyes Peninsula such as the Lighthouse, Tomales Point, and Drakes Estero. Overall, construction-related impacts on visitor and resident resources would be minor under Alternatives A and B and moderate under Alternatives C and D. The small 11-acre wetland restoration or mitigation component under the No Action Alternative would be expected to have only a barely detectable (negligible) construction-related effect.

Following project implementation, Alternatives A and B would have more extensive public access facilities and attractions/uses that would be a major or substantial benefit to visitors and residents. There would be two through-trails. The southern perimeter through-trail would connect from 3rd and C Street in Point Reyes Station to the White House Pool County park via a non-vehicular bridge over Lagunitas Creek. There would be the potential for this trail to be extended to Inverness Park in the future in a collaborative project with the county, once technical problems with road deterioration have been addressed. The eastern perimeter through-trail would connect from Mesa Road, where a small parking lot (~4-5 cars) would be constructed, to the existing Tomales Bay Trail on the Martinelli Ranch. Under Alternative A, this trail would be constructed as an earthen berm with culverts to convey groundwater flows from the Point Reyes Mesa, while under Alternative B, the berm would be replaced with a low-elevation boardwalk that would be coated with a material designed to increase traction for horses.

Under Alternative A, the existing informal trail on the West Pasture north levee would be retained, but under Alternative B, it would be eliminated. Elimination of this trail would result in some impacts to public access resources, particularly for birdwatchers that intermittently use the levee during the winter to view rare bird species such as California black rails. These impacts would be expected to be negligible to minor overall and would be offset slightly by construction of a viewing area near the existing road pull-out and the fact that maintenance of a trail in this location was incompatible with protection of special status species. Additional viewing areas and overlooks, as well as interpretative exhibits, would be constructed near the Giacomini dairy facility, the Giacomini Hunt Lodge off Mesa Road, and at the terminus of the Tomales Bay Trail under Alternatives A-C. The portion of the southern perimeter trail from the 3rd and C Street trailhead in Point Reyes Station to the viewing area at the Giacomini dairy facility would be constructed to be ADA-compliant and would provide opportunities for those with physical disabilities to also experience and enjoy the restored wetland. In general, the two through-trails would serve hikers, equestrians, and bicyclists, although use of the existing informal path at the West Pasture north levee would continue to be limited to hikers under Alternative A. Dogs on-leash would continue to be allowed on the informal trail in the East Pasture, however, ff at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the East Pasture informal trail could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1). Dogs would not be allowed in any areas where they are not currently allowed, which include the eastern perimeter trail and the West Pasture north levee trail under the No Action Alternative and Alternative A.

Alternative C would provide moderate benefits for public access resources, although there would be slightly fewer trails and facilities. It would still include the southern perimeter through-trail between Point Reyes Station and White House Pool County park with the possibility for a future extension to Inverness Park through a collaborative project with the county. However, the Point Reyes Station entrance to the trail would be switched from 3rd and C Street, where it is located under Alternatives A and B, to an improved entrance in the Green Bridge County Park adjacent to the Green Bridge. While the entrance would be formally switched, some people would probably continue to informally access trails from 3rd and C Street, because it is the existing access point and is the closest access point from downtown Point Reyes Station. The Park Service would continue to maintain an administrative access road with gate at this location.

The eastern perimeter trail would be converted under Alternative C from a through-trail to two spur trails. One spur trail would extend the existing Tomales Bay Trail southward several hundred feet along the railroad grade to allow for viewing opportunities of the restored wetland and an existing shallowly flooded flat that attracts considerable numbers of waterbirds in the winter. The other would originate near the small parking lot at Mesa Road and would lead to the viewing area near the Giacomini Hunt Lodge. Under Alternative C, the ADA-compliant access component would be switched from the southern perimeter trail to the Mesa Road spur trail, which would be improved to meet Outdoor Recreational ADA standards. Combined with the Giacomini Hunt Lodge viewing area, this ADA-compliant trail would also allow those with physical disabilities to experience and enjoy the restored wetland. Both the southern and eastern perimeter trails would be open to hikers, equestrians, and bicyclists, although use by equestrians and bicyclists would be probably be reduced along the eastern perimeter due to elimination of the through-trail component.

Alternative D would provide the fewest improvements in public access resources relative to the other action alternatives. The southern perimeter trail would be converted from a through-trail to an enhanced or improved spur trail that would be accessed from Point Reyes Station by a trailhead near the Green Bridge. On the eastern perimeter, the number of spur trails would be reduced to one, which would extend the Tomales Bay Trail slightly southward. In the FEIS/EIR, Alternative D also includes an ADA-compliant trail, low-elevation viewing platform, and vault toilet facility would be constructed at the White House Pool County park. The number of viewing areas and overlooks would be reduced to three (West Pasture north levee, Giacomini dairy facility, Tomales Bay Trail terminus). These spur trails would continue to be open to hikers, bicyclists, and equestrians, although use by bicyclists and equestrians would be reduced relative to Alternatives A-B because of the lack of a through-trail component. While Alternative D does not include construction of a non-vehicular bridge, the Park Service would commit to working with the County of Marin in the future on additional public access facilities on the southern perimeter, including reevaluation of Levee Road and the Green Bridge, possible extension of a trail to Inverness Park, and/or construction of a non-vehicular bridge across Lagunitas Creek at the site of the old summer dam through a separate environmental compliance process.

Construction or enhancement of public access facilities could have negligible to minor adverse effects on public safety conditions. While creation of through-trails would decrease the potential for accidents by at least partially moving people off the road, access to these trails would still need to occur via existing roads. Therefore, benefits to public safety provided by these trails could be offset by the increased risk of pedestrian and bicycle conflicts with motor vehicles at trailheads such as those at the Green Bridge County park, the White House Pool County park, and Olema Marsh trail associated with minor increases in visitation. Also, pedestrians and bicycles would be more likely to ride along the shoulders of Sir Francis Drake Boulevard and Levee Road to reach trailheads, as well as to cross busy streets. Increased visitation would likely result in negligible to minor increases in associated traffic and thereby increase risks to bicyclists, as well as pedestrians.

Increased visitation due to restoration of the wetland and construction or enhancement of access facilities could also have negligible to minor effects on the amount of use of County Park facilities at White House Pool and Green Bridge County parks, but this increase in use would be expected to have no more than a negligible effect on facility maintenance needs relative to existing conditions and not to result in or to accelerate "substantial physical deterioration of the facilities."

Visitor and Resident Experience – Viewshed Resources

In addition to active recreational, visitors and residents can experience the beauty of national parks and undeveloped areas through viewsheds or aesthetically pleasing vistas. Viewsheds in the Project Area include both low-elevation viewpoints along roads and trails, as well as higher elevation ones on the Point Reyes Mesa and Inverness Ridge, which include many rural residential developments. Motorists can catch glimpses of the southern and northern portions of Olema Marsh on Bear Valley Road and Levee Road, respectively, and of the western portion of the Giacomini Ranch along portions of Sir Francis Drake Boulevard. Groundwater and small creeks along the base of the Inverness Ridge have promoted growth of stands of riparian scrub-shrub and forest (see Vegetation Resources) that obscure portions of the pasture from vehicular, pedestrian, and cyclist passers-by on Sir Francis Drake Boulevard and along other areas of the perimeter. The lower elevation White House Pool County Park trail and the two Giacomini Ranch informal paths offer more constrained views of Lagunitas Creek, pastoral areas with cows, riparian habitat, the forested Inverness Ridge, the heavily vegetated Point Reyes Mesa bluff, and/or undiked marshlands. Views from the town of Point Reyes Station are reduced by the presence of the dairy facility buildings and barns, some of which are quite tall. Views from town primarily consist of pastures, grazing cattle, and the heavily forested Inverness Ridge.

Over the long-term, the proposed project would remove somewhat unsightly agricultural infrastructure that disrupts the integrity and unity of the existing Pastoral Landscape and restore a more Natural Landscape within the Project Area. Construction would temporarily adversely affect visual resources through the presence of earthmoving equipment, earthmoving activities, and spoil and equipment piles, with the intensity and degree of impact related to the areal extent and intensity of earthmoving activities and the number of viewsheds affected. During construction, impacts to visual resources would range from negligible adverse under the No Action Alternative because of construction of the 11-acre wetland mitigation component in the very northern end of the East Pasture to moderate adverse for Alternatives B – D because the restoration component would involve both the entire East and West Pastures, as well as Olema Marsh under Alternatives C and D.

After construction, the Project Area would go through a short-term transitional, ruderal phase as the Giacomini Ranch and Olema Marsh adapt to changed conditions. In the Giacomini Ranch, pastures would respond to the absence or decreased intensity of grazing, discontinuation of agricultural management, and elevated soil nutrient levels through a shift to plant communities dominated by weedier, more opportunistic plant species, as well as an overall increase in plant biomass or height of vegetation. Under Alternatives A – D, portions subject to tidal flooding would begin to convert from pasture to marsh, leading to establishment of a more Natural Landscape. Under the No Action Alternative and Alternatives A – B, Olema Marsh would continue its current, somewhat visually subtle trend of conversion of fringing riparian habitat to freshwater marsh as surface water levels continue increasing. However, under Alternatives C and D, in which Olema Marsh would be restored through an improvement in hydraulic connectivity, extensive vegetation dieback would be expected to occur in the marsh in response to dramatic changes in water levels, topographic elevations, soils, and soil and water chemistry. Ultimately, these short-term, transitional changes would result in minor adverse impacts under the No Action Alternative and Alternatives A – B and moderate adverse impacts under Alternatives C – D.

Several facilities are proposed to expand or enhance public access opportunities in the Project Area. The most prominent of the public access components proposed is the bridge spanning Lagunitas Creek for the southern perimeter trail, which would connect the town of Point Reyes Station with White House Pool County park. Height of the bridge would need to exceed 16- to 17- feet NAVD88 to allow conveyance of 10-year flood event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows, including the 1- to 2-feet of freeboard that is typically incorporated. Elevation of adjacent lands in White House Pool County park are approximately 11 feet NAVD88, so the bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade. The bridge would be specifically be designed to minimize to the extent possible its visual impacts, and every effort would be made to ensure that it did not exceed the height of the adjacent tree canopy, which is roughly 30-feet (41 feet NAVD88) in height. Because it would break up the broad sweep of Lagunitas Creek as viewed from points east and west of the bridge, such as White House Pool and Inverness Ridge, it would likely have a minor to moderate adverse effect on the visual integrity or intactness and unity of visual resources in the immediate vicinity, most of which are relatively natural in appearance.

Over the long term, all action alternatives would be expected to have a moderate beneficial effect through conversion of heavily managed agricultural lands or Pastoral Landscapes to Natural Landscapes characterized by a much wider diversity of wetland habitats and wildlife species. Beneficial effects would be only minor under the No Action Alternative, because there would be less active restoration. However, over time, ruderal vegetation that would establish over the short-term would probably convert to a more natural grassland vegetation community with less weeds and lower vegetation height once nutrient levels decreased to levels more characteristic of ungrazed or lightly grazed systems.

Socioeconomics

The Seashore is one of the 30 most visited parks in the National Park system. It is a destination park for national and international visitors, as well as a regularly visited resource for the 5 million residents of the nine (9) counties that comprise the greater San Francisco Bay Area. Visitation to the park is approximately 2.5 million annually and is unusually consistent year-round, averaging roughly 200,000 visitors monthly. Marin County has a $500 million annual tourist industry, and it is estimated that the Seashore contributes more than $80 million to the regional economy visitor expenditures on dining, fuel, gifts, groceries, and lodging (NPS 2002). Total visitor spending was $87 million in 2000 or $80 million excluding local visitors (Michigan State University 2001). This spending of visitors from outside the local region generates $69 million in sales by local tourism businesses, yielding $25.6 million in direct income and supporting 1,100 jobs. Including secondary effects, the total economic impact of the park on the local economy is $113 million in sales, $42 million in wages and salaries, and 1,800 jobs (Michigan State University 2001).

The proposed project would have the potential to adversely affect socioeconomic conditions in the local community during construction, if construction-related impacts such as traffic delays or noise reduce visitation to the Project Area and other portions of the Seashore or local community. Over the long-term, beneficial effects would generally be expected from the slight increase in visitation to the restored wetlands and to the constructed and improved public access facilities under Alternatives A – D, although the increase in numbers would be low enough that only a barely measurable or minor effect would be expected on the local and regional economy.

Park Management and Operations

Planning and other activities conducted for the proposed project to date have been almost exclusively funded out of non-Park Service monies. The wetland restoration component has received funding from CalTrans, SS Cape Mohican oil spill settlement funds, and several other private grant sources (Gordon and Betty Moore Foundation, National Fish and Wildlife Foundation, North American Wetlands Conservation Act, National Wetlands Conservation Act, State Water Resources Control Board Proposition 50). The CalTrans and Cape Mohican funding has covered expenses of from one to two term FTE employees and occasional seasonal hires involved in planning and overseeing the proposed project. Since acquisition of the property, annual expenditures for the project, including personnel, monitoring, some property maintenance, and contracting for baseline studies including hydrodynamic modeling, ranged from $132,026 to $277,833 annually through September 2005. Personnel costs incorporated most of the environmental compliance activities for the proposed project, as well as a substantial amount of the vegetation and wetland-related baseline studies.

The proposed project has received some federal funds and support. Federal monies used for the proposed project came from $1.55 million in Congressional appropriations used to purchase the Giacomini Ranch and two competitive grant programs (Conservation Challenge Initiative and Park Service-USGS). Permanent base-funded Seashore staff has assisted with administration of the project, such as contracting, payroll, benefits administration, personnel, and maintenance associated with immediate operations and maintenance needs. On an annual basis, it is estimated that, on average, permanent, base-funded staff contribute less than 25 FTE days each year to the proposed project. Because the Giacomini Ranch currently has no park facilities, maintenance is not performed by Park staff, except for flood-related maintenance activities. Because the Giacominis continue to operate the Giacomini Ranch, existing informal social paths are not currently maintained by the Seashore.

While construction costs for restoration would be funded by private monies, the proposed project has the potential to have a negligible adverse effect on park management and operations following construction through expenditures related to administrative costs and long-term operations and maintenance or life-cycle costs. Most of the long-term park operations costs would be associated with the public access facilities, as the restoration component of the proposed project has been designed specifically to not require future maintenance actions to complete or expand restoration in the future (with the exception of the adaptive restoration component in Olema Marsh). Overall, lifecycle costs to maintain the public access facilities identified as part of all action alternatives are not anticipated to exceed $50,000 or 1 percent of the annual park operating budget. It should be noted that overall costs may rise with inflation, but general level of effort is not anticipated to exceed these projected levels.

Other Impact Analyses Mandated by DO-12 and CEQA

Relationship between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

The Giacomini Ranch was established through diking of a historic salt marsh in 1946. Running of a viable dairy in this location has required substantial investments in terms of maintenance of levees, tidegates, culverts, ditches, and irrigation that would have made continued operation of this dairy in the future economically tenuous, if not infeasible, particularly in view of the current market dynamics in California, in which large Central Valley dairies are threatening the viability of smaller operations such as those in west Marin. While dairy operation has not eliminated wetlands from the Giacomini Ranch, it has reduced functionality of these wetlands by disconnecting them from hydrologic sources such as Lagunitas and Tomasini Creek through levees, tidegates, and culverts and introducing new sources of contamination from intensive grazing, manure spreading, and other agricultural management practices. Viewed from this perspective, the dairy represents a short-term use of the environment that has impacted long-term productivity of natural resources within the Tomales Bay watershed.

Each of the action alternatives (A-D) would enhance long-term productivity of natural resources in the Tomales Bay watershed, with the intensity of enhancement related to the increasing scale of restoration proposed under each of the various alternatives. Under all action alternatives, the closure of an operating dairy and restoration of natural hydrologic and ecological process to the Project Area would only enhance long-term environmental protection and productivity.

Irreversible or Irretrievable Commitment of Natural or Depletable Resources

The proposed project would not cause irreversible changes to the environment relative to baseline conditions, as the wetland restoration components under all of the alternatives could easily be leveed and returned to conditions somewhat similar to those currently existing, although there would be changes in the vegetation communities present without agricultural management practices such as irrigation. Unless some restored wetland remained, however, such an action would violate the terms of the Park Service's mitigation agreement with CalTrans and require the Park Service to repay funds that it received to purchase the ranch and conduct planning and implementation of the wetland mitigation/restoration. The Park Service has also received monies from other private and public entities that were awarded on the basis of the Park Service restoring a significant portion of the Giacomini Ranch.

Construction of the wetland restoration and public access components would involve irretrievable use of depletable petroleum resources, although the overall effect on this increasingly scarce resource would be expected to be negligible. The amount of fuel that would be used is not known, but construction would be expected to take anywhere from three (3) to 16 months over a period of three (3) to four (4) years and involve use of three (3) to five (5) pieces of construction equipment, which would be unlikely to be operating simultaneously. Relative to baseline conditions, implementation of the action alternatives would incur no to extremely negligible irreversible or irretrievable commitment of natural or depletable resources. While use of vehicles for travel to and from the new and enhanced existing public access facilities would increase to some degree, use of construction equipment for maintenance would decrease, and truck trips to the Giacomini Ranch associated with twice daily milk pick-ups and hauling of livestock would be eliminated, thereby offsetting any increase in the number of personal vehicles in terms of use of depletable or non-renewable resources.

Avoidable and Unavoidable Major or Significant Adverse Impacts

There would be no unavoidable significant adverse impacts from construction or implementation of any of the alternatives, including the No Action Alternative.

The No Action Alternative would also have no avoidable significant adverse impacts. Alternatives A and B would have two potentially major adverse impacts that would be considered substantial and significant under CEQA and major under NEPA – 1) exceedance of maximum noise levels for certain sensitive receptors that are directly adjacent to the Project Area during construction and 2) conflict with LCP and Point Reyes Station Community Plan policies regarding protection of riparian and Point Reyes Mesa Bluff habitat because of removal of 0.88-acre of riparian habitat during construction of the eastern perimeter trail. These impacts would be mitigated to less than significant under CEQA and minor to moderate, respectively, under NEPA using mitigation measures. For noise impacts, mitigation would involve using measures that are considered standard construction Best Management Practices (BMPs) for reducing impacts of construction noise to sensitive receptors, including reducing the number of concurrently operating pieces of equipment and delaying construction start times in sensitive construction zones. Impacts to riparian habitat would be mitigated under Alternatives A and B through active and passive restoration of 3.2- to 4 acres of riparian habitat, respectively, in other Streamside Conservation Areas, including Lagunitas Creek, Fish Hatchery Creek, and, under Alternative B, Tomasini Creek, thereby resulting in a net gain of 2.5- 3.2 acres.

In addition to noise, Alternatives C and D could have one or more other potentially major adverse impacts that would be considered substantial and significant under CEQA and major under NEPA. Under Alternatives C and D, potential increases in average salinities or chlorides in upstream portions of Lagunitas Creek during spring or high tide events associated with increasing tidal prism in Olema Marsh could negatively affect municipal water supply operations by increasing the duration of special pumping practices (e.g., off-tide pumping or taking one of the wells off-line) or the amount of time needed for freshwater recharge to reduce chlorides in the alluvial aquifer that serves as the source of West Marin's groundwater supply. To mitigate the potential impacts to NMWD operations, major adaptive elements for restoration of Olema Marsh would not be implemented unless: 1) further monitoring and modeling show that elevated salinities in Lagunitas Creek do not pose a problem for the groundwater supply or that restoration of Olema Marsh would not cause an increase in salinities; or 2) NMWD moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. The major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts. Through iterative hydrodynamic modeling runs, the Park Service, ACR,

and CSLC would work with its hydrologic consultants to identify limited restoration actions that could be implemented without causing potentially no more than minor impacts to upstream Lagunitas Creek salinities and NMWD operations.

Under Alternative D, there is also the potential for major impacts associated with exceedance of BAAQMD air quality criteria for NOX emissions during construction. These air quality impacts would be associated with operation of construction equipment during the more intensive construction phase in the second construction year or season. As with noise, the air quality impact would be mitigated to less than significant levels under CEQA and moderate intensity under NEPA using mitigation measures recommended by BAAQMD to reduce NOX emissions, which would include restrictions on the number of simultaneously operating pieces of construction equipment.

While these mitigation measures are believed to be effective enough to reduce these impacts to less than significant, if their effectiveness is reduced, these impacts could become unavoidable significant adverse impacts. Over the long-term, however, the air quality and noise impacts are very temporary and related only to construction, which lessens their severity relative to short-term or long-term permanent impacts. While impacts to riparian habitat and municipal water supply operations are not necessarily just construction-related, mitigation measures proposed for these impacts are considered effective enough to successfully reduce these impacts to minor or moderate at the most.

Growth-Inducing Impacts

None of the alternatives would be expected to have growth-inducing impacts. They would not permanently affect any public services such as power, water, sewer, roads, schools, hospitals, and other facilities and services or would not affect them in such a way that would induce growth in the local community or west Marin region. Under the terms of the purchase agreement with the Giacomini Trust, the 7-year Reservation of Use Agreement that has allowed the Giacomini family to continue to operate the dairy since its purchase by the Park Service in 2000 will expire in March 2007, and the dairy will close. Closure of the dairy will occur under all alternatives. Discontinuation of intensive dairying operations could increase the attractiveness for future development of parcels that are already zoned for commercial or residential development along C Street in Point Reyes Station or along Sir Francis Drake Boulevard in Point Reyes Station, however, this factor would be common to all alternatives and would not necessarily be related to the proposed project.

Because the Giacomini Ranch may continue to be grazed to some degree or, if grazing is not authorized, allowed to become fallow grasslands, the No Action Alternative might result in slightly less desirable conditions adjacent to parcels zoned for commercial and residential development relative to the other alternatives, but these parcels would be likely to be developed regardless due to the high property values and quality of life present in the Point Reyes region, as well as the overall attractiveness and scenic value of the area regardless of restoration.

Consultation and Coordination

Public Scoping and Additional Information Gathering Efforts

Extensive efforts have been made by the Park Service and CSLC to involve the interested and affected public through a series of meetings, mailings, and workshops. A more detailed description of public scoping efforts can be found in Chapter 5. Public scoping was initiated under NEPA on September 23, 2002, with publishing of a Notice of Intent (NOI) to prepare an EIS in the Federal Register (Volume 67, No. 184). Following agreement by CSLC to act as the lead CEQA agency, a Notice of Preparation (NOP) for preparation of a joint EIS/EIR was prepared by CSLC, the lead CEQA agency, and distributed to the State Clearinghouse. The public scoping period closed on June 30, 2003.

Public comments were heard at the October 19, 2002, Advisory Commission meeting at the Point Reyes Dance Palace where approximately 30 to 40 members of the public attended. The public comments focused on concerns and questions regarding public access, land use planning, hydrology, alternatives, and project planning. In addition to comments received at the public meeting, approximately 86 individuals or private organizations mailed, faxed, or emailed comments regarding the proposed project.

Following scoping, the Park Service and CSLC held a series of internal workshops designed to prioritize

restoration objectives based on a number of factors, including mitigation requirements, project Purpose, project Goals, and concerns raised by the public and agencies during scoping. The Park Service staff began working with its hydrologic consultants, KHE, to develop preliminary restoration and public access concepts.

After a series of internal meetings, the Park Service and CSLC initiated a series of alternative workshops to present preliminary restoration and public access concepts to local and regulatory agencies, adjacent landowners, and technical experts in the field of wetland restoration. A public workshop held on June 22, 2004, at the Point Reyes National Seashore (Seashore) Red Barn. More than 110 people attended the meeting. Following the meeting, the public had a 30-day period ending July 23, 2004, in which to submit comments to the Park Service on the restoration concepts and scope of the proposed DEIS/EIR. During this period, the Park Service received more than 100 letters or petitions, phone calls, and requests for meetings. As with the initial comment, most of the comments received during the public workshop and the subsequent scoping period concerned public access.

In response to the considerable public scrutiny of the public access portion of the Project, the Park Service contracted for further technical evaluation of public access. As part of this effort, several meetings were conducted in March 2005 with adjacent residents during preparation of this document to better define potential technical feasibility and land use issues. In addition, a meeting for the general public was held on April 11, 2005, at the Red Barn at the Seashore. At this meeting, the consultants, LandPeople, discussed the potential trail alignments and some of the preliminary findings regarding technical feasibility and land uses. Approximately 40-50 people attended this meeting.

Value Analysis

Following conceptual approval by the Park Service's Development Advisory Board, received in June 2005, the Park Service held a Value Analysis process in August 2005, which enabled the Seashore and CSLC to determine whether it had developed a reasonable range of alternatives that would meet the Park Service mission, as well as the Project's purpose and objectives. Value Analysis attendees included a broad range of technical experts from both within the Seashore and the GGNRA, as well as from other parks and agencies, including CSLC and Marin County Department of Public Works. Comments during the Value Analysis process were again used to further refine alternatives. The Park Service presented these refined alternatives to the Park Service's Development Advisory Board and received pre-design approval in November 2005.

Agency Involvement and Scoping

Agency scoping was conducted throughout the project planning process to ensure that agencies became familiar with the proposed project and thereby ensure that the Seashore and CSLC had ample opportunities to learn of any relevant issues or concerns early in the planning process when information could be easily incorporated into information gathering efforts or into the alternative development process. For this reason, the Park Service and CSLC made several efforts to meet with agencies for the purpose of disseminating and gathering information.

Regulatory scoping meetings were conducted on November 6, 2002, with a follow-up meeting for the Gulf of the Farallones National Marine Sanctuary on November 8, 2002. Attending this November 6, 2002, meeting, in addition to Park Service and CSLC staff and technical consultants, were representatives from the RWQCB, Corps, NMFS, CalTrans, NMWD, CDFG, Marin County Department of Public Works, Marin County Parks and Open Space, U.S. Geological Survey - Biological Resources Division, USFWS, and CCC.

On February 26, 2004, the Park Service and CSLC convened a second meeting with regulatory as one of the initial alternative workshops to provide information and gather feedback on the preliminary restoration and public access concepts. Representatives from regulatory and public agencies at this meeting, in addition to Park Service staff and technical consultants, included RWQCB, Marin County Parks and Open Space District, NMWD, Marin Resource Conservation District, Corps, Marin County Department of Public Works, and CalTrans.

In addition to these meetings, the Park Service also met separately on several occasions with representatives of the USFWS and NMWD to present information and discuss proposed alternatives and mitigation measures.

Public Review of DEIS/EIR

The federal Notice of Availability for the DEIS/EIR was published in the Federal Register on November 3, 2006. A notification that the DEIS/EIR had been filed with the USEPA (EIS No. 20060502) was published on December 15, 2006. A notice that the DEIS/EIR had been filed with the State Clearinghouse (SCH # 2002114002) was published on December 18, 2006.

A public meeting was held to discuss the alternatives and potential benefits and impacts of the proposed alternatives on January 25, 2007. Approximately 100 members of the public attended the meeting. The approximately 60-day period for comments for the public comment period closed February 14, 2007. Approximately 187 individuals, organizations, and agencies mailed, faxed, or emailed comments regarding the proposed project. On March 2, 2007, the USEPA published its findings on review of the draft EIS/EIR as Lack of Objection (LO), noting that the "EPA supports the proposed project and believes it will significantly improve the hydrologic and ecological processes and functions in the Tomales Bay Watershed." A more detailed description of the public and agency comment and Park Service and CSLC response can be found in Chapter 5.

Intentionally Left Blank

Table of Contents

CHAPTER 1: PURPOSE AND NEED FOR ACTION

Introduction **1**
Need for Proposed Project **5**
Purpose of Proposed Project **7**
Background on Property Purchase and Mitigation Requirements 7
Project Purpose and Relationship to Park Service Mission and Policies 8
Primary Project Constraints 12
Legislative and Policy Guidance and Other Considerations Used in Developing Purpose and Alternatives **13**
National Park Service Legislation 13
Specific Park Legislation and Policies 14
Executive Orders 14
Other Federal Legislation 15
State and Local Legislation, Policies, and Plans 17
Other Considerations 18
Issues and Concerns Raised During Scoping **19**
Public, Agency, and Internal Scoping Process 19
Additional Public and Agency Comment and Input after Scoping 19
Scoping Issues and Concerns 19
Public Review of DEIS/EIR 20
Impact Topics Analyzed in this DEIS/EIR **20**
General and Agricultural Land Use 20
Geologic Resources 21
Soil Resources 21
Air Resources 22
Water Resources – Hydraulics and Hydrologic Processes 22
Water Resources – Water Salinity and Water Quality 22
Vegetation Resources 22
Fish and Wildlife Resources 23
Cultural Resources 23
Public Health and Safety 24
Public Services 24
Visitor and Resident Experience 24
Socioeconomics 25
Park Management and Operations 25
Impact Topics Dismissed from Further Assessment **25**
Unique Ecosystems, Biosphere Reserves, World Heritage Sites 25
Environmental Justice in Minority and Low Income Populations 26
Tribal Land Use and Sacred Sites 26
Energy Resources 26
Long-Term Management of Resources and Land/Resource Productivity 26

CHAPTER 2: ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

Overview of Alternatives **27**
Project Planning and Alternatives Development Process **27**
Alternatives **30**
Detailed Project Area Description 32
Existing or Baseline Conditions 35
No Action Alternative, including Actions Common to All Alternatives **38**
Restoration and Management Actions Common to All Alternatives 39
Mitigation/Restoration and Management Actions Unique to the No Action Alternative 43
Public Access Unique to the No Action Alternative 44
Construction 45
Alternative A – Limited Restoration of the Giacomini Ranch East Pasture Only with Expanded

Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter, Including Actions Common to All Action Alternatives 46
Restoration 48
Management 52
Public Access 53
Construction 56
Alternative B – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter 58
Restoration 58
Management 65
Public Access 66
Construction 68
Alternative C (Preferred Alternative) – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access 70
Restoration 70
Management 77
Public Access 78
Construction 80
Alternative D (Environmentally Preferred Alternative) – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access 82
Restoration 82
Management 88
Public Access 89
Construction 91
Alternative or Alternative Components Considered, but Not Analyzed Further 93
Alternative or Alternative Components Subjected to Additional Analysis to Determine Feasibility Prior to Elimination from Further Analysis 95
Eliminated Alternatives – Public Access 95
Eliminated Alternatives - Restoration: Olema Marsh 97
Impact Avoidance and Mitigation Measures 98
Engineering Geologic/Geotechnical Measures 98
Design and Construction Commitments 98
Measures to Protect Water Quality 98
Measures to Protect Wildlife 99
Measures to Protect Vegetation and Prevent the Introduction and Spread of Invasive Plant Species 100
Measures to Protect Wetland Resources 100
Spill Prevention and Response Plan 100
Measures to Protect Natural Quiet and Soundscapes 101
Measures to Protect Air Quality 101
Measures to Address Effects on Traffic 102
Measures to Protect Public Services 102
Measures to Protect Cultural Resources 102
Measures to Protect Recreational Use 102
The Environmentally Preferred Alternative 103
Sections 101(b) and 102(1) of NEPA 103
The Preferred Alternative 104

CHAPTER 3: AFFECTED ENVIRONMENT

Introduction 137
Project Setting 138
Regional and Park Context 138
Park and Project Area History 138
Regional and Project Area Climate 140

Land Use and Planning 141
General Land Use and Planning 141
Agricultural Land Use 150
Geologic Resources 152
Geologic Resources within the Region and Project Area 152
Topographic Resources within the Region and Project Area 155
Geologic Resource Issues - Geologic Hazards 160
Geologic Resources and Wetland Functionality 166
Soil Resources 166
Soil Resources within the Project Area 166
Soil Resource Issues - Prime and Unique Farmland Soils 169
Soil Resource Issues - Sediment Quality and Contamination 171
Soil Resources and Wetland Functionality 174
Air Resources 175
Air Resource Issues - Air Quality 175
Air Resource Issues – Noise and Soundscapes 179
Water Resources – Hydraulics and Hydrologic Processes 180
Regulatory and Policy Setting 181
Water Resources – Tidal and Freshwater Flows 181
Water Resources – Floodplains 200
Water Resources - Sediment Transport Dynamics 202
Hydrologic Processes and Wetland Functionality 207
Water Resources – Water Salinity and Water Quality 209
Water Salinity 209
Water Quality 214
Water Salinity and Quality and Wetland Functionality 227
Vegetation Resources 228
Regional Setting 228
Regulatory and Policy Setting 229
Vegetation Communities 230
Vegetation Communities of Special Significance – Wetlands and Riparian Areas 241
Vegetation Communities of Special Significance – CNDDB Natural Communities 252
Special Status Plant Species 253
Threats from Non-Native and Invasive Plant Species 258
Vegetation Resources and Wetland Functionality 260
Fish and Wildlife Resources 261
Fish and Wildlife Resources Setting 262
Regulatory and Policy Setting 263
Fish and Wildlife Habitats 264
Fish and Wildlife Habitats of Special Significance 270
General Fish and Wildlife Use 271
Special Status Fish and Wildlife Species 281
Threats from Non-Native and Invasive Wildlife Species 293
Fish and Wildlife Resources and Wetland Functionality 295
Cultural Resources 297
Background and Regulatory and Policy Setting 297
Tribal Lands 298
Archeological Resources 298
Cultural Landscapes and Features 298
Historic Structures 299
Public Health and Safety 300
Flooding and Public Safety 300
Disease and Public Health 306
Public Services 309
Municipal Water Supply 309
Wastewater Treatment and Disposal 317
Traffic and Transportation 320
Visitor and Resident Experience – Public Access Resources 326
Regional and Park Setting 326

Regulatory and Policy Setting 327
Public Access Opportunities within the Project Area and Vicinity 328
Visitor and Resident Experience – Visual Resources and Viewsheds 333
Background and Regulatory and Policy Setting 333
Visual Resources and Viewsheds in the Project Area and Immediate Vicinity 333
Socioeconomic Resources 339
Park Operations and Management Resources 340
Background 340
Park Operation and Management Resources 340
Project Operation and Management Resources 341

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Introduction 343
General Methodology for Assessing Impacts 344
Baseline Conditions 344
Nature of Impacts 344
Intensity of Impacts 344
Impairment 347
Mitigation 348
Duration of Impacts 348
Type of Impacts 348
Context of Impacts 349
Projects Considered in Cumulative Impacts Analysis 349
Resource-Specific Assessment of Impacts 352
Land Use and Planning – General Land Use 352
Land Use and Planning – Agricultural Land Use 360
Geologic Resources 369
Soil Resources 381
Air Resources – Air Quality 393
Air Resources - Noise and Soundscapes 409
Water Resources – Hydraulics and Hydrologic Processes 425
Water Resources –Water Quality 446
Vegetation Resources 467
Fish and Wildlife Resources 500
Cultural Resources 565
Public Health and Safety – Flooding 571
Public Health and Safety – Disease and Public Health 583
Public Services – Municipal Water Supply and Distribution 594
Public Services – Wastewater Treatment and Disposal 607
Public Services - Traffic and Transportation 612
Visitor and Resident Experience – Public Access Resources 626
Visitor and Resident Experience – Visual Resources and Viewsheds 644
Socioeconomics 657
Park Management and Operations 662
Other Impact Analyses Mandated by DO-12 and CEQA 670
Relationship between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity 670
Irreversible or Irretrievable Commitment of Natural or Depletable Resources 672
Avoidable and Unavoidable Major or Significant Adverse Impacts 674
Growth-Inducing Impacts 676

CHAPTER 5: CONSULTATION AND COORDINATION

Introduction 679
Project Planning and Scoping 679
Identification of Lead and Other Interested Agencies 679
Public Scoping 679

Additional Information Gathering Efforts 680
Agency Involvement and Scoping 682
Summary of Public and Agency Comments 683
Release of Draft EIS/EIR for Public Review and Comment 684
Compliance Status 686
Federal Regulations 686
State and Local Legislation, Policies, and Plans 688
List of Preparers 690
List of Agencies and Organizations to Whom Notices of the Environmental Impact Statement/Environmental Impact Report are Being Sent 692
Federal Agencies 692
Federal Advisory Groups 692
Elected Officials 692
State Agencies 692
Regional, County, and Municipal Agencies 692
Non-Governmental Organizations, Non-Profit Organizations, etc. 692
Libraries 693

Literature Cited 733

Index 757

List of Figures

Figure 1. Giacomini Wetland Restoration Project Vicinity Map 3
Figure 2. Giacomini Wetland Restoration Project Area 4
Figure 3. Existing Conditions and Facilities 33
Figure 4. No Action Alternative 40
Figure 5. No Action Alternative – Public Access 41
Figure 6. Total Excavation and On-Site and Local and Regional Off-Site Disposal 46
Figure 7. Potential Sediment Disposal Quarry Locations 47
Figure 8. Alternative A – Restoration and Management 49
Figure 9. Alternative A – Public Access 54
Figure 10. Example of prefabricated bridge structure (LandPeople 2005) 55
Figure 11. Alternative B – Restoration and Management 59
Figure 12. Alternative B – Public Access 67
Figure 13. LandPeople Trail Graphic 68
Figure 14. Alternative C – Restoration and Management 71
Figure 15. Alternative C – Public Access 79
Figure 16. Alternative D – Restoration and Management 83
Figure 17. Alternative D – Pubic Access 90
Figure 18. County Land Use Designations 145
Figure 19. County Zoning 146
Figure 20. Local Geology 154
Figure 21. Historic Map of Southern Tomales Bay 157
Figure 22. Intertidal Elevations 159
Figure 23. Earthquake Hazards 162
Figure 24. Liquefaction Susceptibility 165
Figure 25. Soil Types 167
Figure 26. Farmland Soil Type 170
Figure 27. Hydrologic Sources 182
Figure 28. Topography and Bathymetry of Lagunitas Creek Channel Banks and Bottom 187
Figure 29. Lagunitas Creek Daily Average Flows 211
Figure 30. Vegetation Communities 231
Figure 31. Native and Non-Native Vegetation Communities 234
Figure 32. Corps Jurisdictional Wetlands and Waters 244
Figure 33. Wetlands Potentially Subject to CCC Oversight 246
Figure 34. Riparian and Buffer Habitat 249
Figure 35. Special Status Plant Occurrences 255
Figure 36. Wildlife Habitat 265
Figure 37. Locations of NMWD Wells and Pipelines 310
Figure 38. Existing Conditions – Public Access 330
Figure 39. Viewshed Analysis Locations 335
Figure 40. Sensitive Noise Receptors and Construction Zones 412
Figure 41. Flood Assessment Areas 574

List of Tables

Table 1. Alternative Comparison 42
Table 2. Degree to which Alternatives Meet Stated Objectives of Proposed Project 106
Table 3. Summary of Impacts 109
Table 4. Maximum Earthquake Anticipated on Major Faults in Vicinity of Point Reyes National Seashore 163
Table 5. Overview of Pollutants of Greatest Concern in the SFBAAB 176
Table 6. Ambient Air Quality Standards & Bay Area Attainment Status 177
Table 7. Tidal Datums for NOAA Tide Gauge, Tomales Bay at Inverness Tidal Epoch: 1960-78 186
Table 8. Hydrologic Infrastructure and Management Practices Impacting Impediment Surface Freshwater . 188
Table 9. Selected Water Quality Objectives under the San Francisco Basin Plan 216
Table 10. Frequency of Exceedance of RWQCB Basin Water Quality Objectives during Sampling Periods ... 220
Table 11. Acreages of the Most Dominant Vegetation Communities Mapped in the Project Area..... 232
Table 12. Acreages of Jurisdictional Section 404 Wetlands and Waters and Section 10 Waters 245
Table 13. Acreages of Cowardin Systems and Classes in the Giacomini Delineation Study Area 247
Table 14. Acreage of Riparian, Bluff, and Other Habitat Potentially Subject to Regulation or Oversight 251
Table 15. Acreage of Special Status Plant Species Directly in the Project Area 256
Table 16. Acreage of the Dominant Invasive Non-native Plant Species 259
Table 17. Acreage of High Value Wildlife Habitats in the Giacomini Ranch and Olema Marsh Areas..... 266
Table 18. Presence of General wildlife groups, class, or orders and representative taxa and/or species 275
Table 19. California red-legged frog breeding in West Pasture freshwater marsh and Fish Hatchery Creek . 286
Table 20. Estimated Frequency of Flooding by Lagunitas Creek under Existing Conditions 304
Table 21. Flood Discharge Estimates for Various Return Intervals 305
Table 22. Stop Sign-Controlled Intersection LOS Designations 321
Table 23. Roadway LOS Designations 321
Table 24. General Methodology for Assessing Impacts 344
Table 25. Actions Included in Cumulative Effects Analysis..... 350
Table 26. Land Use and Planning- General Land Use 354
Table 27. Intensity of Impacts for Land Use and Planning – General Land Use. 356
Table 28. Land Use and Planning - Agricultural Land Use 362
Table 29. Intensity of Impacts for Land Use and Planning – Agricultural Land Use 363
Table 30. Unique Geologic Resources 370
Table 31. Topographic Resources..... 371
Table 32. Surface Fault Rupture Hazards 371
Table 33. Groundshaking and Liquefaction Hazards 372
Table 34. Coastal Bluff Stability 373
Table 35. Intensity of Impacts for Geologic Resources 373
Table 36. Estimation of Changes to Topographic Resources 374
Table 37. Sediment Quality - Nutrients 382
Table 38. Sediment Quality – Contaminants 383
Table 39. Intensity of Impacts for Soil Resources 383
Table 40. Air Quality – All Pollutants Related to Construction Emissions 396
Table 41. Air Quality – Carbon Monoxide – Project-Related 397
Table 42. BAAQMD CEQA Thresholds of Significance for Total Emissions Resulting From Project Operations 397
Table 43. Air Quality – Total Emissions Effects – Project-Related 398
Table 44. Air Quality – Odors 399
Table 45. Intensity of Impacts for Air Quality Resources. 399
Table 46. Estimated emissions from earthmoving and infrastructure removal from construction 400
Table 47. Noise and Soundscapes – Construction-Related Effects 413
Table 48. Noise and Soundscapes – Project-Related Effects 414
Table 49. Intensityof Impacts for Air Resources – Soundscapes..... 414
Table 50. Surface Tidal Hydrologic Processes 426
Table 51. Surface Freshwater Hydrologic Processes 427
Table 52. Hydrologic Functions - Floodplains and Floodwater Retention 427
Table 53. Hydrologic Processes – Sediment Transport..... 428
Table 54. Intensity Impacts for Water Resources –Hydraulics and Hydrologic Processes..... 429
Table 55. Estimated Changes to Hydraulic/Hydrologic Processes..... 429
Table 56. Water Quality – Project Area 448
Table 57. Water Quality - Watershed..... 448
Table 58. Intensity of Impacts for Water Resources – Water Quality 449
Table 59. Native Vegetation Communities 469
Table 60. Wetlands..... 469

Table 61. Riparian and Bluff Habitat 471
Table 62. Special Status Plant Species 471
Table 63. Invasive Plant Species 473
Table 64. Intensity of Impacts for Vegetation Resources. 473
Table 65. High Value Wildlife Habitats in the Project Area 501
Table 66. General Wildlife Use of the Project Area 502
Table 67. Invasive Wildlife Species 503
Table 68. Potential for Wildlife Conditions in Watershed to be Affected by Proposed Project 503
Table 69. Special Status Wildlife Species – Construction-Related Effects 504
Table 70. Special Status Wildlife Species - California Red-legged Frog 505
Table 71. Special Status Wildlife Species – Tidewater Goby 506
Table 72. Special Status Wildlife Species - Salmonids 507
Table 73. Special Status Wildlife Species - Rails 509
Table 74. Special Status Wildlife Species – Other Species 509
Table 75. Intensity of Impacts for Fish and Wildlife Resources 510
Table 76. Cultural Resources -- Cultural Landscapes 566
Table 77. Intensity, Nature, Type, Duration, and Context of Impacts for Cultural Resources 567
Table 78. Public Health and Safety - Flooding 572
Table 79. Intensity of Impacts for Public Health and Safety - Flooding 573
Table 80. Disease and Public Health – Disease Vectors 584
Table 81. Intensity of Impacts for Public Health and Safety – Disease and Public Health – Disease Vectors 585
Table 82. Public Services – Municipal Water Supply and Distribution 597
Table 83. Intensity of Impacts for Public Services – Municipal Groundwater Distribution and Supply 597
Table 84 Hydrodynamic modeling results for average salinity concentrations in Lagunitas Creek 598
Table 85. Public Services – Wastewater Treatment and Disposal 608
Table 86. Intensity of Impacts – Wastewater Treatment and Disposal 609
Table 87. Public Services – Traffic and Transportation – Construction-Related Impacts 614
Table 88. Public Services – Traffic and Transportation – Project-Related Effects 615
Table 89. Public Services – Parking – Project-Related Effects 616
Table 90. Public Services – Alternative Transportation (Pedestrian and Bicycle Circulation) 617
Table 91. Intensity of Impacts for Traffic and Transportation 617
Table 92. Public Access Resources – Construction-Related Effects 627
Table 93. Public Access Resources – Project-Related Effects 628
Table 94. Public Access Resources – Public Safety Conditions 629
Table 95. Public Access Resources – Effect on Facilities of Other Agencies 630
Table 96. Intensity of Impacts for Visitor and Resident Experience – Public Access Resources 630
Table 97. Visitor and Resident Experience – Visual Resources and Viewsheds 645
Table 98. Intensity of Impacts for Visual Resources and Viewsheds 645
Table 99. Socioeconomic Resources 657
Table 100. Intensity of Impacts for Socioeconomic Resources 658
Table 101. Park Management and Operations 662
Table 102. Intensity of Impacts for Park Operations and Management 663
Table 103. Comments Received During Comment Period and Response from Lead Agencies 694

Acronyms

AAQS	National Ambient Air Quality Standards
ABAG	Association of Bay Area Governments
ACR	Audubon Canyon Ranch
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AF	acre-feet
afy	acre-feet per year
AMCA	American Mosquito Control Association
APZ	Agricultural Production Zone
AQRVs	air quality-related values
ARA	Avocet Research Associates
ASBS	Areas of Special Biological Significance
ASC	Ambient Sediment Criteria
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practice
BSSC	Bird Species of Special Concern
CAA	Clean Air Act of 1970
CalIPC	California Invasive Plant Council
CARB	California Air Resources Board
CBSC	California Building Standards Code
CCC	California Coastal Commission
CCCESU	central California coast Evolutionarily Significant Unit
CDFG	California Department of Fish and Game
CEQ	Council of Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMA	Congestion Management Agency
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CRLF	California red-legged frog
CSLC	California State Lands Commission
CWP	Marin Countywide Plan
CZMA	Coastal Zone Management Act
dBA	decibels
dB-Ldn	Decibel Day-Night Average Level
DEIS	Draft Environmental Impact Statement
DHS	California Department of Health Services
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat

EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ERL	Effects-Range Low
ERM	Effects Range-Median
ESA	Endangered Species Acts
ESU	Evolutionarily Significant Unit
ETM	Estuarine Turbidity Maximum
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
FSC	Federal Species of Concern
FSRC	Federal Species of Regional Concern
GGNRA	Golden Gate National Recreation Area
GMP	General Management Plan
gpm	gallons per minute
HUD	United States Department of Housing and Urban Development
IMPROVE	Interagency Monitoring of Protected Visual Environments
ISP	Invasive Spartina Project
IWCP	Indiana Wetlands Conservation Plan
KHE	Kamman Hydrology Engineering
LCP	Local Coastal Program
LESA	California Agricultural Land Evaluation and Site Assessment
LMER	Land-Margin Ecosystem Research
LOS	Levels of Service
MBARI	Monterey Bay Aquarium Research Institute
MBAS	Methlyene-Blue Active Substances
MBTA	Migratory Bird Treaty Act
mg/L	milligrams/Liter
MHW	Mean High Water
ml	milliliter
MLLW	Mean Lower Low Water
MOU	Memorandum of Understanding
mpn	most probable number
MSL	Mean Sea Level
NAVD88	North American Vertical Datum 1988
NEHRP	The National Earthquake Hazards Reduction Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NMWD	North Marin Water District
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent

NOP	Notice of Preparation
NOX	nitrogen dioxide
NPS	National Park Service
NRCS	National Resources Conservation Service
NTU	Nephelometric Turbidity Units
NWI	National Wetland Inventory
OLW	Ordinary Low Water
OPR	Governor's Office of Planning and Research
PCB	Polychlorinated Biphenyl
pH	potenz or potential hydrogen (the degree of acidity or alkalinity in water)
PL	Public Law
PM10	particulate matter less than 10 microns
ppt	parts per thousand
PRNSA	Point Reyes National Seashore Association
PWA	Philip Williams and Associates
RMP	Resources Management Plan
ROG	Reactive Organic Gas
RWQCB	Regional Water Quality Control Board
SAFZ	San Andreas Fault Zone
SDWA	Safe Drinking Water Act
SFBAAB	San Francisco Bay Area Air Basin
SFEP	San Francisco Estuary Project
SFSU	San Francisco State University
SHPO	State Historic Preservation Officer
SIP	state implementation plans
SOX	sulfur dioxide
SWRCB	State Water Resources Control Board
TBA	Tomales Bay Association
TBBI	Tomales Bay Biodiversity Inventory
TBSTAC	Tomales Bay Shellfish Technical Advisory Committee
TBWC	Tomales Bay Watershed Council
TMDL	Total Maximum Daily Load
TRIM	Tidal, Residual, and Intertidal Mudflat
TSS	Total Suspended Solids
UBC	Uniform Building Code
UFAS	Uniform Federal Accessibility Standards
UNESCO	United Nations Educational, Scientific and Cultural Organization
USC	United States Congress
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USSCS	United States Soil Conservation Service
WCB	Wildlife Conservation Board

Intentionally Left Blank

Chapter 1

Purpose and Need for Action

Introduction

This Final Environmental Impact Statement/Environmental Impact Report (FEIS/EIR) has been prepared to assist the public, the National Park Service (Park Service), and the California State Lands Commission (CSLC) in formulating a wetlands restoration plan for the Waldo Giacomini Ranch (Giacomini Ranch) and Olema Marsh. Together, the Giacomini Ranch and Olema Marsh represent the Project Area for the Giacomini Wetland Restoration Project (hereinafter referred to as the proposed project).

This document has been prepared in accordance with both the 1969 National Environmental Policy Act (NEPA) and the 1970 California Environmental Quality Act (CEQA). The intent of both NEPA and its California counterpart, CEQA, is to help local, state, and/or federal agencies make informed decisions regarding the environmental impact of proposed actions. As required by NEPA and CEQA, this FEIS/EIR analyzes a full range of alternatives that could meet the objectives for the plan — that is to restore wetlands and to create public access opportunities within the Project Area — and presents a comparison of the probable impacts of implementing each.

The Project Area is located approximately 40 miles northwest of San Francisco in Marin County, California (Figure 1). The Giacomini Ranch lies at the southern end of Tomales Bay, a 6,800-acre, 12-mile-long, approximately 1-mile-wide estuarine embayment that runs along Point Reyes National Seashore (Seashore)'s northern perimeter (RWQCB 2001; Figure 2). The towns of Point Reyes Station and Inverness Park border the Project Area to the east and west, respectively. Lagunitas Creek, the largest subwatershed within Tomales Bay, bisects the Giacomini Ranch into the East and West Pastures. Olema Marsh is located directly south of the Giacomini Ranch at the downstream end of Bear Valley Creek before its confluence with Lagunitas Creek.

The Park Service is acting as the lead NEPA agency and principal project proponent and manager. The Park Service owns approximately 550 acres of the Giacomini Ranch (Figure 2). The portion of Lagunitas Creek in between the Giacomini Ranch's East and West Pastures and the undiked or unleveed tidal lands north of the Giacomini Ranch are owned by the CSLC and have the potential to be affected by the proposed project (Figure 2). CSLC has agreed to participate as the lead under CEQA. The Park Service also owns approximately 50 percent of Olema Marsh. Two of the five proposed alternatives involve restoration of the 63-acre Olema Marsh, which is also partially owned by the non-profit organization, Audubon Canyon Ranch. Audubon Canyon Ranch is actively working with the Park Service and CSLC on the proposed project. The Park Service and CSLC have also been working collaboratively with the County of Marin Public Works department and the County of Marin Parks and Open Space district, as well as the Gulf of the Farallones National Marine Sanctuary, whose jurisdiction extends into the southern portion of Tomales Bay.

Excessive sedimentation in the Tomales Bay watershed during the late 1800s from logging and agricultural development resulted in large-scale conversion of subtidal and unvegetated intertidal aquatic habitats to vegetated intertidal marsh, nearly doubling wetland acreage in the bay. Many of these tidal marshes were subsequently disconnected by construction of berms or earthen "walls" for roads, railroads, livestock ponds, and duck clubs that isolated marshes both hydrologically and ecologically from Tomales Bay.

These hydrologic and topographic alterations not only often converted salt marsh to freshwater marsh or even upland or non-wetland habitats, but substantially reduced the functionality of these marshes in terms of storing floodwaters, dissipating the energy of flood flows, improving water quality, and supporting wildlife. The largest loss of hydrologically connected wetlands came with diking of approximately 550 acres for operation of the Waldo Giacomini dairy ranch and pastures in 1946. Since then, the Project Area has been subjected to numerous hydrologic and topographic changes or alterations to improve operation of the dairy, including construction and maintenance of levees, tidegates, and culverts to exclude tides and restrict creek flow; ditching and straightening of creeks; frequent dredging of ditches and creeks; spreading of manure; irrigation of pastures to improve forage; and grazing.

A large portion of Tomales Bay watershed lands were acquired by the Park Service in the 1960s and 1970s for establishment of two neighboring parks -- Point Reyes National Seashore (Seashore) and Golden Gate National Recreation Area (GGNRA). In 1980, the boundary for GGNRA was expanded to include the Giacomini Ranch and the eastern portion of Tomales Bay. The Giacomini Ranch falls within the north district of the GGNRA, which is administered by the Seashore. For several decades, the Park Service discussed purchase of the ranch with the Giacomini family for the purposes of restoring the historic coastal marsh, however, funding did not become available until the early 1990s. The ranch was eventually acquired in February 2000 with a combination of Congressional appropriations and state monies. State funding was secured from the California Department of Transportation (CalTrans), which transferred funds to the Park Service for purchase, planning, and implementation of a restoration project in exchange for the Park Service assuming wetland mitigation obligations for impacts associated with a repair of State Route 1 in the coastal portion of Marin County.

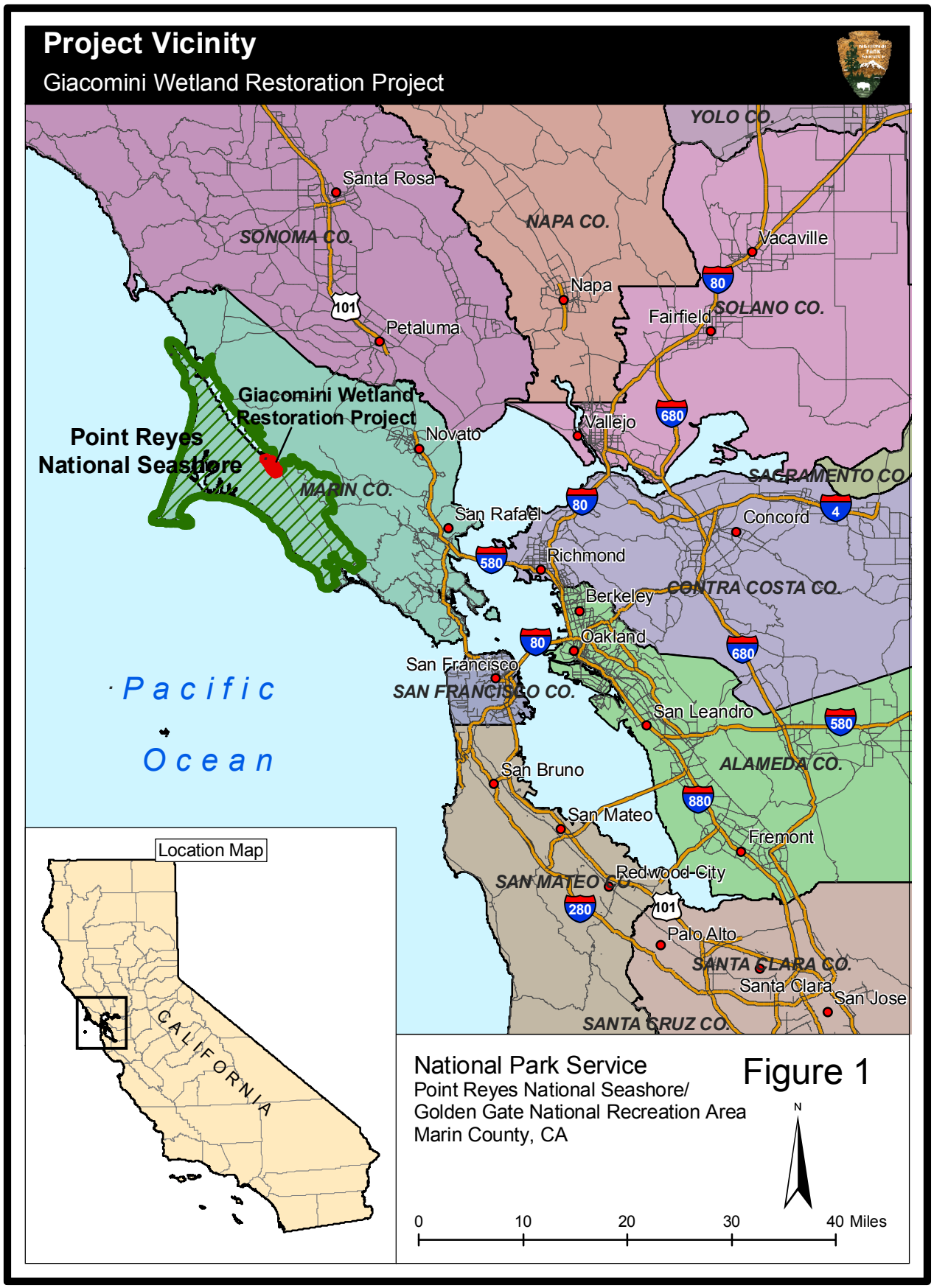
The purpose of the proposed project is to restore natural hydrologic and ecological processes and functions on a significant portion of the Project Area.

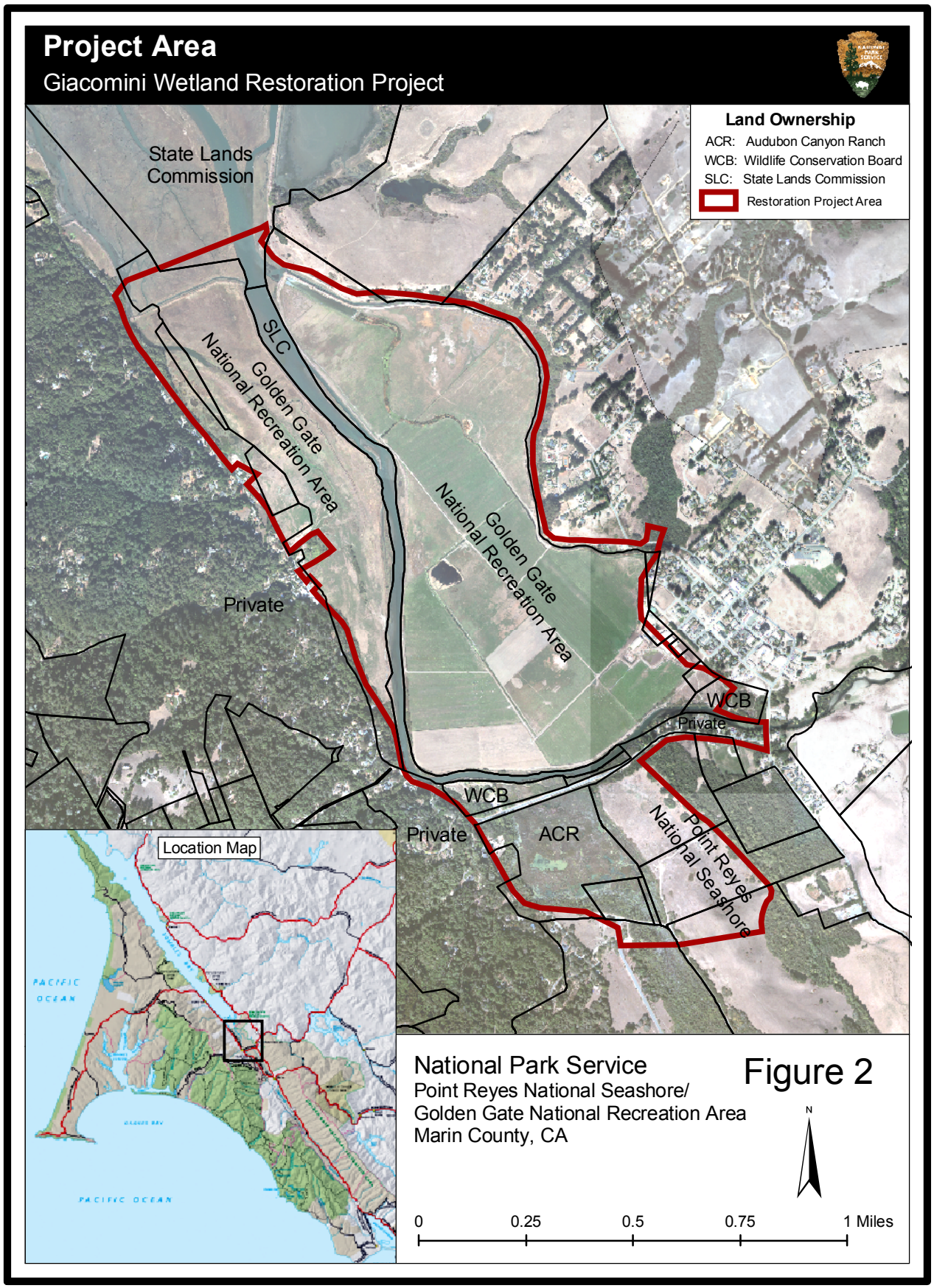
While the Park Service is required under its agreement with CalTrans and regulatory agencies to mitigate only a small amount of wetlands, the purpose of the proposed project is to restore natural hydrologic and ecological processes and functions on a significant portion of the Project Area. Natural hydrologic processes include marine-influenced tidal action with the daily ebb and flood of tides and fluvial or creek action, which encompasses the seasonal cycle of freshwater flow, as well as overbank flooding onto floodplains and movement of the creek channel during storm events. These hydrologic processes drive important wetland functions that benefit both wildlife and humans such as floodwater storage, water quality improvement, groundwater recharge, food production, and wildlife habitat. The Park Service has developed a range of alternatives for the Giacomini Ranch and Olema Marsh that vary in the amount of levee or berm removal, removal or modification of hydrologic control structures such as culverts and tidegates, habitat enhancement and creation, and public access opportunities.

Restoration will not only improve natural resource conditions on the Giacomini Ranch, thereby increasing the value of resources on Park Service lands and contributing to fulfillment of the Park Service's mission of protection, conservation, and restoration of natural resources, including wetlands. It will also contribute to the health of the entire Tomales Bay watershed by increasing functionality of the Giacomini Ranch wetlands, supporting the Park Service's commitment to managing parks as part of an integrated landscape with other public and private lands (NPS 2006, Section 4.1.4). While perceived as pristine, Tomales Bay has been declared impaired under Section 303(d) of the Clean Water Act by the San Francisco Regional Water Quality Control Board (RWQCB) for excessive sediment, nutrients, pathogens, and mercury.

Pacific Ocean and outer Tomales Bay

Two-thirds of the freshwater inflow — and potentially the principal sediment, nutrient, and pathogens source — to Tomales Bay flows through the Project Area (Fischer et al. 1996). By restoring natural hydrologic processes through removal of levees, tidegates, and culverts, floodwaters of Lagunitas Creek carrying sediment, nutrients, and other pollutants will able to flood onto its historic floodplains to be filtered and transformed by the restored wetlands, thereby improving downstream water quality. These restored wetlands would not only benefit water quality and increase habitat and food resources for wildlife within the watershed, but would provide opportunities for public enjoyment and education through inclusion of public access trails, viewing overlooks and platforms, and interpretative exhibits.


Project Vicinity
Giacomini Wetland Restoration Project
YOLO CO.
Santa Rosa
SONOMA CO.
NAPA CO.
Vacaville
Napa
SOLANO CO.
Fairfield
Petaluma
Giacomini Wetland Restoration Project
Point Reyes National Seashore
Novato
Vallejo
SACRAMENTO CO.
MARIN CO.
San Rafael
Concord
Richmond
CONTRA COSTA CO.
Berkeley
Oakland
San Francisco
SAN FRANCISCO CO.
Pacific Ocean
San Leandro
ALAMEDA CO.
San Bruno
San Mateo
Fremont
Redwood City
SAN MATEO CO.
Palo Alto
SANTA CLARA CO.
Santa Clara
San Jose
SANTA CRUZ CO.
Location Map
CALIFORNIA
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
Figure 1
N
0
10
20
30
40 Miles


Project Area
Giacomini Wetland Restoration Project
Land Ownership
ACR: Audubon Canyon Ranch
WCB: Wildlife Conservation Board
SLC: State Lands Commission
Restoration Project Area
State Lands Commission
SLC
Golden Gate National Recreation Area
Golden Gate National Recreation Area
Private
WCB
Private
WCB
Private
ACR
Point Reyes National Seashore
Location Map
PACIFIC OCEAN
PACIFIC OCEAN
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
Figure 2
N
0
0.25
0.5
0.75
1 Miles

Need for Proposed Project

Commercial, residential, and agricultural development has caused loss of more than 91 percent of California's historic coastal wetlands (Dahl 1990). While development has not affected Tomales Bay to the extent it has other watersheds in California, a large percentage of the coastal tidal wetlands once present in Tomales Bay have been lost or substantially altered through diking or construction of levees for roads, railroads, livestock ponds, and duck clubs. In the late 1800s, excessive sedimentation from logging and agricultural development resulted in large-scale conversion of subtidal and unvegetated intertidal aquatic habitats in Tomales Bay to vegetated intertidal marsh. Wetland acreage in the bay nearly doubled from 584 acres in 1863 to 944 acres in 2001 (Parsons and Allen 2004c). On the eastern side of Tomales Bay, many tidal marshes that fringed the bay were diked for construction of the North Pacific Coast Railroad line to the Russian River in Sonoma County or roads such as State Route 1 (Figure 2). At the turn of the 20th century, the 63-acre Olema Marsh and the downstream portions of Bear Valley Creek were substantially altered by construction of two roads-- Bear Valley Road and Levee Road (i.e., southeastern portion of Sir Francis Drake Boulevard between Highway 1 and Bear Valley Road) – either along its perimeter or across the marsh's mouth to Lagunitas Creek (Figure 2). Bear Valley Creek and Olema Marsh were further impacted by dams used to impound the creek for operation of a duck club (KHE 2006a).

The importance of wetlands comes from the valuable functions that these habitats provide to both humans and wildlife.

The largest impact to the Tomales Bay watershed, however, came in 1946 with diking and draining of approximately 550 acres of historic tidal marsh at the southern end of Tomales Bay for operation of the Giacomini Ranch, a large-scale dairy operation. The former marsh represented approximately 58 percent of the historic wetlands once present in Tomales Bay and was once an integrated tidal wetland complex with Olema Marsh. Since the 1860s, levees have almost completely disconnected Giacomini Ranch and Olema Marsh hydrologically from Lagunitas Creek. Disconnection of Olema Marsh from Lagunitas Creek has been exacerbated by undersized or poorly functioning culverts. Levees have also eliminated connectivity between Giacomini Ranch and Tomasini Creek, which was completely moved of its historic channel alignment to increase the extent of pastures. Tidegates and culverts have dramatically reduced, if not entirely precluded, tidal influence from Tomales Bay in both the Giacomini Ranch and Olema Marsh. Fill or sediment disposal has either eliminated historic wetlands, such as in the White House Pool and Green Bridge County Parks directly south of the Giacomini Ranch, or caused impoundment of waters such as in Olema Marsh. In addition, the former marshes in Giacomini Ranch and Olema Marsh have been ditched to encourage drainage. Forage conditions for dairy cattle at the Giacomini Ranch were enhanced not only through improved drainage, but through seeding of pasture grasses and forbs and irrigation during the summer. Giacomini Ranch pastures have also been subject to varying degrees of manure spreading and mowing, as well as grazing.

While diking has not eliminated wetlands from Giacomini Ranch and Olema Marsh, most of the important functions played by wetlands require that wetlands be hydrologically connected with both upstream and downstream water bodies. The importance of wetlands comes from the valuable functions that these habitats provide to both humans and wildlife. Wetlands, which include riparian or forested areas as well as marshes, can improve water quality and provide floodwater storage, food chain support, and wildlife habitat. Hydrologically connected wetlands -- or wetlands that are connected to upstream and downstream water bodies and have natural hydrologic processes -- have the potential to reduce the velocity and energy of storm-associated high tides and flood flows and often act as a temporary or long-term storage or detention basin for these waters, functioning as "floodplains." In addition, nutrients, sediment, pathogens, and contaminants carried by tidal or storm flows are often filtered out of waters and either assimilated by plants or incorporated into sediment. Perhaps, the most well-known role played by wetlands is that of wildlife habitat. Hundreds of species either live in wetlands or use them during certain periods of their life cycle for foraging, breeding, resting, or as a "nursery" during juvenile stages. In addition, wetlands support species in open

water areas by exporting sources of carbon or food in the form of plant matter, seeds, plankton, invertebrates, and fish.

The number and value of wetland functions are often greatly reduced in diked or disturbed systems. Levees have dramatically reduced floodwater retention in floodplains of Lagunitas Creek and Tomasini Creek, with levees along Lagunitas Creek potentially exacerbating flooding of adjacent private properties. Removal of riparian vegetation during maintenance of levees has also decreased vegetation that helps to dissipate the energy of flood flows, leading to faster, more turbulent, and erosive flood flows. In Olema Marsh, steadily increasing water surface levels created by poor drainage of Bear Valley Creek flows have not only reduced the potential volume of floodwater that can be stored, but threaten to increase flooding of adjacent county roadways such as Levee Road and Bear Valley Road.

While the Giacomini Ranch and Olema Marsh are still largely wetland and home to at least two federally listed threatened or endangered species, their value to the larger Lagunitas Creek and Tomales Bay ecosystems has been greatly diminished by land degradation and the lack of hydrologic connectivity with source water bodies. On the Giacomini Ranch, grazing by dairy cows, spreading of manure, and ditching has decreased water quality within creeks, ditches, and ponds, leading to a relatively depauperate aquatic community composed almost exclusively of fish and invertebrates tolerant of harsh conditions. Wetlands on the Giacomini Ranch largely consist of monotypic expanses of wet pasturelands created through seeding of non-native grasses and herbs and lack the structural habitat diversity so important to wildlife. Most of the wildlife use and diversity that does occur comes from the mix of habitat at the ranch's edge, where seeps create riparian forests and freshwater marshes adjacent to the expanses of pasture. The pastures often support only scattered numbers of roosting waterfowl, foraging raptors and passerines, small mammals such as voles, and the occasional mule deer or red fox, with most of the waterfowl and shorebirds attracted to the few ponds, ditches, and shallowly flooded areas on the ranch. The conversion of Olema Marsh to freshwater marsh through diking has ostensibly increased its attractiveness to some wildlife species, such as waterbirds, but it likely has also displaced species that could have historically occurred in the transitional zone between fresh and salt water, such as the federally listed endangered species, tidewater goby (*Eucyclogobius newberryi*).

Wetland and floodplain functionality is particularly important in Tomales Bay. Historically, the Bay has been viewed as a pristine estuary and even used as a reference site in ecological studies. However, the largely rural nature of this watershed has not rendered it immune to impact from human uses, including failing septic systems, agriculture, mercury mining, landfill operations, and oil spills. Beaches and swimming areas within the Bay and adjacent areas sometimes must be closed due to poor water quality conditions. During the last decade, poor water quality has forced one of the bay's leading industries, oyster fisheries, to close down several times and, in the late 1990s, was associated with a virus outbreak in people eating oysters from Tomales Bay. Mercury mining in the Tomales Bay watershed during the late 1960s-1970s caused deposition of mercury-contaminated sediment into the Bay and continues to threaten commercially and recreationally important fisheries. Watershed threats are not limited to internal ones, either: the bay's proximity to San Francisco's high-volume shipping lanes has resulted in contamination from oil spills. The failure of Tomales Bay to consistently meet water quality standards for designated beneficial uses such as oyster mariculture and public recreation and wildlife needs prompted the San Francisco District of the Regional Water Quality Control Board (RWQCB) to designate the bay and some of its subwatersheds as impaired for sediment, nutrients, pathogens, and mercury under Section 303(d) of the Clean Water Act. The RWQCB is in the process of finalizing or developing several new water quality standards for Tomales Bay through the Total Maximum Daily Load (TMDL) process, which sets maximum limits of loading to designated water bodies for pollutants of concern such as sediment, nutrients, pathogens, and mercury.

Water quality problems threaten not only the oyster fisheries and humans using the Bay for recreational purposes, but the freshwater, estuarine, and marine wildlife species that use Tomales Bay for breeding or foraging habitat. Because of its importance to wildlife, Tomales Bay is not only part of the Golden Gate Biosphere Reserve and a California Critical Coastal Area, but in 2002, it was nominated as a "Wetland of International Importance" under an international treaty called the Convention on Wetlands (commonly known as the Ramsar Convention). Tomales Bay is also one of 16 wetland areas that qualify for inclusion as a wetland of regional importance under the Western Hemisphere Shorebird Reserve Network because of its large number of wintering and migrating shorebirds (Kelly 2001). The bay represents the second largest Pacific Herring spawning estuary in the state of California and is home to some of the state's largest populations of birds such as bufflehead (*Bucephala albeola*), black brant (*Branta bernicla*), red knot (*Calidris canutus*), and riparian associates such as saltmarsh common yellow-throat (*Geothlypis trichas sinuosa*; Sacramento USFWS Species of Concern and California Species of Concern). The water quality problems

described above have the potential to cause widespread adverse effects to these and other important wildlife populations that use the bay for all or part of their life cycles, including critical stages such as breeding or the early stages of development (such as for fish nurseries). Elevated mercury levels continue to be problematic for many fish species, especially for those near the top of the food chain such as sharks, and are high enough that fish consumption advisories for humans were established in 2000 for many bay-endemic species.

These threats have galvanized community-led efforts to improve the health of Tomales Bay. The Tomales Bay Watershed Council, which is composed of watershed stakeholders from many different agencies and organizations in Marin and the surrounding San Francisco Bay region, recently developed a stewardship plan that has established water quality improvement and restoration and preservation of the integrity of natural habitats and native communities as key goals (TBWC 2003). These goals are consistent with those of the Park Service, which has begun to incorporate enhancement and restoration as well as preservation and conservation of natural resources into its stewardship mission. The Park Service strongly emphasizes restoration of the quality of surface and ground waters and wetland processes and functions in its Management Policies (NPS 2006). The Seashore and the GGNRA have embarked upon a number of enhancement and restoration projects that focus on improving the quality of natural resources within these parks, with the proposed project being one of the largest.

The Watershed Council believes that achievement of the water quality goal will come primarily through reducing non-point sources of water pollution (TBWC 2003). However because wetlands act as filters for contaminants and sediment before they reach the bay, restoration projects such as that proposed for the Giacomini Ranch would also help meet this objective. Two-thirds of the freshwater inflow – and potentially the principal source of nutrients, pathogens, and sediment -- to Tomales Bay comes from directly upstream of the Giacomini Ranch (Fischer et al. 1996). Reconnecting or improving the hydrologic connection between the Project Area and Tomales Bay would also restore several hundred acres of scarce wetland habitat for wildlife, including some that are listed as threatened or endangered by regulatory agencies, thereby also enabling the proposed project to help the council meet one of its other goals – restoration of the integrity of natural habitats and native communities.

The potential importance to the health of Tomales Bay and the outer Marin coastline of restoring hydrologic connectivity between the Giacomini Ranch, Olema Marsh, and Tomales Bay is underscored by the relative scarcity of coastal wetlands present along the central California coastline. Giacomini Ranch and Olema Marsh account for as much as 12 percent of the historic wetlands present along the outer central California coast and as much as 1 percent of wetlands along the entire outer California coastline. The relative scarcity of coastal wetlands present within this watershed and the surrounding California coastline increases their importance and the impact of losses that have occurred.

Purpose of Proposed Project

Background on Property Purchase and Mitigation Requirements

In February 2000, the Park Service purchased the Giacomini Ranch in Point Reyes Station for the purposes of restoring the historic coastal marsh. The Giacomini Ranch is located within the north district boundary of the GGNRA, which is administered by the Seashore. The Seashore also owns approximately 50 percent of Olema Marsh, with Audubon Canyon Ranch, a project partner, owning the other half. The Giacomini Ranch dairy and adjoining areas were incorporated into the GGNRA boundary when it expanded in 1980, although the ranch and many other lands remained in private ownership at that time. During the 1980s, the Park Service held discussions with the Waldo Giacomini family about possibly acquiring the Project Area for wetland restoration. At that time, the Giacominis indicated that they were willing to sell most of the lowland or pasture parcels and selected portions of upland parcels on the Point Reyes Mesa, but wanted to retain ownership of several parcels in the West Pasture along Sir Francis Drake Boulevard and a portion of the Dairy Facility that fronts C Street in Point Reyes Station.

Purchase of these parcels did not become feasible, however, until the Park Service secured the necessary funding from CalTrans and congressional appropriations. In the early 1990s, the California Coastal Commission (CCC) ordered CalTrans to mitigate for impacts to natural aquatic habitat resources associated with repair of State Route 1 in the vicinity of Lone Tree Creek in Marin County after landslide damage in early

1990. CalTrans decided to look for opportunities to transfer mitigation obligations rather than performing mitigation in-house and considered several projects along the Marin coastline. During this period, the GGNRA contracted with an independent hydrologist to assess the feasibility of restoring natural wetland conditions to the Giacomini Ranch lands. The hydrologists concluded that restoration of the Ranch was, indeed, feasible, and developed some preliminary restoration concepts (Philip Williams Associates (PWA) et al. 1993). This information provided support for selection of the Giacomini Ranch as the CalTrans-funded mitigation site. In August 1997, the Park Service signed a Memorandum of Understanding (MOU) with CalTrans and the CCC, allowing the Park Service to assume CalTrans' mitigation obligations for the Lone Tree Slide.

In this agreement, the Park Service assumed responsibility for 3.6 acres of mitigation obligations with the understanding that monies would be used for purchasing the Giacomini Ranch for inclusion into the national park system and planning and implementation of a wetland restoration project. The Park Service also secured monies from congressional appropriations to help purchase the Ranch. While the legal agreement between CalTrans and the park only obliges the park to mitigate 3.6 acres, all agencies agreed that more fully restoring lands on the acquired property was the ultimate goal, and the MOU called for restoration of a "significant portion" of the historic marsh.

Transfer of the mitigation money to the Park Service was approved by the CCC on the condition that the Park Service "…would accomplish all requirements of the mitigation plan." These requirements included the items below:

1) Creation of subtidal and intertidal habitat comparable in character to the area that was impacted by the road repair on State Route 1 near Lone Tree Creek; OR
2) Restoration of previously degraded or filled marine or the removal of historic fill, improvement of water circulation, and such other steps as will create or improve habitat for fish, water birds, and other marine or marine-related species.
3) A qualified biologist must prepare a marine mitigation plan that includes a five-year monitoring program and definition of "success" such that density of flora and fauna is comparable with that in surrounding or nearby habitat areas of the same type.

In a separate agreement with the Park Service, CalTrans also stipulated that restoration on the Giacomini Ranch would be in a "manner consistent with the general plan set forth in the feasibility study (PWA et al. 1993).

Currently, as part of the purchase agreement with the Giacomini family, most (463 acres) of the Giacomini Ranch is being managed under reservation of use by the former landowners until 2007, when full management will be transferred to the Park Service. The Giacominis have retained a 25-year reservation of use agreement on the Giacomini Hunt Lodge, a small building located on the eastern perimeter of the property. The Park Service is currently in negotiation with the Giacomini family to exchange some of the upland parcels on the Dairy Facility Mesa for some of the remaining lowland parcels that are still owned by the Giacomini family. Compliance for this transaction is being conducted separately from the proposed project, because the land exchange is not essential for restoration efforts to proceed. While an agreement had not been reached as of the date of this document, the land exchange is considered a reasonably foreseeable project and is included in the Cumulative Impact Analysis.

Project Purpose and Relationship to Park Service Mission and Policies

Background

At the time the Memorandum of Understanding was signed with the CCC and CalTrans, the Park Service described its purpose in purchasing the Giacomini Ranch as "restoring freshwater and saltwater wetlands." As noted earlier, the Giacomini Ranch and Olema Marsh once formed an integrated tidal wetland system with a complex network of tidal creeks and open water areas that likely supported numerous invertebrates, fish, shorebird, and waterfowl species. Large stands of riparian habitat probably once fringed portions of the Project Area where groundwater was abundant or creeks were present. While a large proportion of the

Giacomini Ranch and Olema Marsh is still technically "wetland," as it is seasonally saturated and supports plants adapted to wet soils, these wetlands have been substantially altered and degraded since the late 1800s through a variety of human activities. Logging and agricultural development in the late 1800s and early 1900s accelerated sediment delivery, greatly expanding the size and vertical elevation of the tidal marshes at the mouth of Lagunitas Creek. Levees and installation of culverts and tidegates on major drainages within the Project Area have eliminated or substantially reduced the influence of tides and dramatically altered creek and groundwater hydrology within the former coastal marshes at the Giacomini Ranch and Olema Marsh.

In the Giacomini Ranch, many of the remnant sloughs and creeks have been ditched and are regularly dredged to maintain capacity for irrigation water, affecting plant and invertebrate communities and negatively affecting water quality. Filling, land leveling, manure spreading, mowing, and grazing have dramatically changed the characteristics of the soils and vegetation, as well as its value to wildlife. While there are pockets of native, largely freshwater vegetation communities such as freshwater marsh, wet meadows, and riparian habitat, long-term agricultural management has turned most of the Giacomini Ranch into a monotypic expanse of pasture dominated by non-native grasses and herbs. South of the Giacomini Ranch, construction of two road crossings and several past fill events on its source creek, Bear Valley, have converted Olema Marsh from a tidal marsh to an impounded freshwater marsh system, threatening the extent of fringing riparian habitat, as well as the potential of the Bear Valley Creek subwatershed to support certain wildlife species such as federally-threatened steelhead trout (*Oncorhynchus mykiss*) and federally-endangered coho salmon (*Oncorhynchus kisutch*).

Historically, the Park Service has focused more on preservation and conservation rather than restoration. However, it has come to realize that preservation may not be enough to fulfill the mandates of the Park Service Organic Act of 1916 (Organic Act) or the enabling legislation of many of the park units. Without some action, many valued Park Service assets may continue to degrade or even cease to exist, thereby leaving no legacy for enjoyment of future generations. Recent management policies acknowledge this need to move beyond simple preservation of the "scenery and natural and historic objects and the wild life therein" by encouraging parks to restore natural systems. Furthermore, these policies direct parks to focus on restoring functions, processes, and values within a larger context than just the site, such as the watershed or hydrologic system of creeks and bays in which the Project Area occurs, and also to not necessarily just focus on structure or structural features such as acres of a particular habitat or some specific mix of habitats.

In its 2006 Management Policies, the Park Service urges parks to "re-establish natural functions and processes in parks unless otherwise directed by Congress…..Impacts on natural systems resulting from human disturbances include .....changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated"(NPS 2006, Section 4.1.5).

Wetlands receive special emphasis in the 2006 Management Policies. The Park Service states that it will "strive to achieve a longer term goal of net gain of wetlands across the national park system through restoration of previously degraded or destroyed wetlands" (NPS 2006, Section 4.6.5). Where natural wetland functions have been degraded or lost due to previous or ongoing human activities (e.g., drainage facilities, structures, agriculture), parks are strongly encouraged to "reestablish environments in which wetland ecological processes can function as they did prior to disturbance, to the extent practicable" (Director's Order #77-1). The 2006 Management Policies also call for parks to "protect, preserve, and restore the natural resources and functions of floodplains" (NPS 2006, Section 4.6.4), which includes benefits such as floodwater storage. In addition, all necessary actions to maintain or restore the quality of surface waters and groundwaters within parks to levels consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations should be taken (NPS 2006, Section 4.6.3).

Restoration of water resources and aquatic habitat has been identified as a high priority objective by the Seashore in its General Management Plan (NPS 1980) and Resource Management Plan (NPS 1999). The Seashore's Statement for Management sets the primary resource management objective for the Seashore as the identification, protection, perpetuation, and restoration of "… the diversity of natural ecosystems representative of the California coast" (NPS 1993).

Project Purpose

Through integration of baseline resource information, restoration science tenets, Park Service policy, and mitigation and contractual obligations, the Park Service and the CSLC have developed a purpose, objectives, and planning criteria that were used to guide design of alternatives for the proposed project. In addition to the primary purpose, the Park Service and the CSLC have identified three objectives and 12 planning criteria that either define the purpose more clearly or expand upon the purpose to include other desirable goals. The proposed project's primary purpose and objectives are individually identified and described below. In addition, the Park Service and the CSLC identified primary project constraints that would need to be factored strongly into considering during design, analysis, and implementation.

> *Purpose*: The purpose of the proposed project is to restore natural hydrologic processes within a significant portion of the Project Area, thereby promoting restoration of ecological processes and functions.

Restoration of hydrologic processes would involve

- removal or lowering of levees;
- removal of tidegates;
- removal or replacement of culverts;
- elimination of ditches;
- creation of tidal channels; and
- realignment of creeks into some of their historic channel alignments.

These restoration actions would reintroduce daily tidal action to the now diked wetlands and allow creeks to flood onto their floodplains during storm events. In addition, the discontinuation of agricultural management practices such as ditching and dredging and removal or modification of infrastructure such as levees, tidegates, and culverts would increase the integrity of geomorphic processes within creeks or fluvial systems such as active channel movement, creation of instream habitat features (e.g., pools), and deposition and transport of sediment. Within this very dynamic transitional zone of the Tomales Bay estuary, characterized by freshwater conditions in the winter and saline conditions in the summer, reintroduction of natural hydrologic processes would convert monotypic, non-native-species-dominated pasturelands into a complex mosaic of vegetation communities and potential wildlife habitats that would include salt marsh, freshwater marsh, wet meadows, mesic and dry grasslands, and riparian habitat. Most importantly, reestablishment of natural hydrologic processes would strongly increase functionality of these wetlands, potentially having dramatic effects on reduction of flooding to adjacent properties, quality of waters flowing into Tomales Bay, and habitat and food chain support of wildlife species.

Project Area – View from Northeast

By focusing on restoration of process and function, this project complies with Park Service management policy directives to "re-establish natural functions and processes" and "return human-disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated..." The multi-agency Memorandum of Understanding with which the Park Service needs to comply specifies that mitigation requirements be met through restoration of previously degraded or filled wetland areas by improving water circulation and taking other steps to improve habitat for fish, water birds, and other marine and marine-related species. Restoring natural hydrologic processes is key to improving water circulation and thereby improving habitat for coastal species. In addition, by focusing on removing impediments to process rather than creating and maintaining structure, we are moving away as are others in the wetland restoration community from the "garden" approach to wetland restoration and recognizing the inherent dynamic variability of estuarine transitional systems, thereby decreasing the need for future intervention and maintenance and supporting the recent emphasis within the Park Service on developing sustainable and low–maintenance projects.

The Park Service has developed a preliminary monitoring program framework that will help it determine whether the proposed project has met 1) its purpose and objectives and 2) mitigation and monitoring requirements imposed by the CCC on the types of habitat restored and the quality of this restored habitat relative to supporting the "density of flora and fauna … comparable with that in surrounding or nearby habitat areas of the same type."

Project Objectives

The project objectives not only describe the project purpose in more detail, but identify other "purposes" that are considered desirable. The three objectives are identified and described below:

- *Objective*: *Restore natural, self-sustaining tidal, fluvial (streamflow), and groundwater hydrologic processes in a significant portion of the Project Area, thereby enabling reestablishment of some of the ecological processes and functions associated with wetland and riparian areas, such as water quality improvement, floodwater storage, food chain support, and wildlife habitat.*

- *Objective*: *Pursue a watershed-based approach to restoration in that restoration planning for the Project Area will emphasize opportunities to improve ecological conditions within the entire Tomales Bay watershed, not just in the Project Area itself.*

  Water quality problems in Tomales Bay have spurred the Seashore to either spearhead or actively participate in several pollutant source reduction and ecological restoration efforts being undertaken within the watershed. The centerpiece of the Seashore's efforts in this regard is the Giacomini Wetland Restoration Project. Recognizing the need to expand the benefits of restoration beyond the immediate Project Area, the Seashore and CSLC identified a watershed-based restoration approach as one of the proposed project's objectives early in the planning process. This goal focuses on the idea that restoration should help improve the health of the Tomales Bay watershed. One of the most crucial ways in which this proposed project can assist with watershed goals is through improving the quality of waters entering Tomales Bay. Two-thirds of the freshwater inflow – and, therefore, the potential nutrient, sediment, and pathogen sources – flow into Tomales Bay just upstream of the Giacomini Ranch (Fischer et al. 1996). By removing the levees along Lagunitas Creek, floodwaters carrying sediment and pollutants can flow and settle onto 550 acres of floodplains, where nutrients, pathogens, and contaminants would be filtered and transformed or uptaken by plants. Removing the levees would also increase the amount of floodwaters that could be stored in pastures, potentially reducing the frequency and extent of flooding of and the destructive energy of flood flows to adjacent properties. In addition, restoring hydrologic connectivity would result in improved conditions and food chain support for marine and estuarine wildlife species in Tomales Bay, as well as in the Project Area.

  This watershed-based view of restoration is also in keeping with the Park Service Management Policy direction, which states that, "the Service recognizes that cooperation with other land managers can accomplish ecosystem stability and other resource management objectives when the best efforts of a single manager might fail" (NPS 2006, Section 4.1.4). Local communities and the Tomales Bay Watershed Council have indicated support for the proposed project and have developed projects and initiatives of their own aimed at improving water quality and watershed conditions within the bay. Widespread support from the community bordering the ranch for the project is in large part due to its importance to helping restore conditions in the Tomales Bay watershed. The Point Reyes Station Community Plan (Marin County Community Development Agency 2001) stated that the Giacomini Ranch should be restored to "natural conditions." In addition to its efforts to reduce pollution within the bay, the Tomales Bay Watershed Council has developed a Stewardship Plan (TBWC 2003) that urges that watershed members, including the Park Service, to: 1) protect and promote restoration of proper functioning and hydrology of streams and floodplains and 2) evaluate and optimize tidal circulation in leveed marshes.

- *Objective*: *To the extent possible, incorporate opportunities for the public to experience and enjoy the restoration process as long as opportunities do not conflict with the project's purpose or with Park Service, CSLC, or other agency legislation or policies*.

  The Park Service Management Policies (2006) state that, "providing opportunities for appropriate public enjoyment is an important part of the Service's mission." (NPS 2006, Section 8.1). The policies directly address the recreation and educational values of wetlands, noting that, "when practicable, the

Service will not simply protect, but will seek to enhance, natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions" (NPS 2006; Section 4.6.5). Internal and public scoping for the proposed project identified public access as a key issue in the planning for this restoration effort. The extensive amount of wetlands and sensitive biological resources present in the Project Area makes the integration of public access while ensuring that it "does not disrupt wetland functions" into the proposed project challenging. However, the Park Service and the CSLC have committed to incorporating opportunities for the public to learn about the value of wetlands, the problems facing Tomales Bay, and the restoration process through trails, viewing areas, interpretative exhibits, and volunteer/educational opportunities. In addition, the Seashore and the CSLC also plan to enable people with disabilities to experience wetlands and the restoration process by providing appropriate public access facilities for those with disabilities.

Planning Criteria

Through information gathered in both public and internal scoping efforts, the Park Service and the CSLC further refined the project purpose and objectives into planning criteria. These prioritized criteria provided a conceptual framework for development of a range of feasible restoration and public access alternatives by converting the project purpose into a number of definitive or concrete planning criteria associated with restoration of natural hydrologic and ecological processes and functions. By creating criteria, Park Service and CSLC staff had better tools for assessing the value and appropriateness of proposed alternatives or alternative actions. In addition to incorporating certain wetland processes, functions, and features that the Park Service and CSLC wants to increase or reestablish such as increasing floodplains or reintroducing tidal flow, the planning criteria also address some existing features or species that the Park Service and the CSLC hope to preserve such as the freshwater-dependent species, California red-legged frog (*Rana aurora draytonii*); the brackish water-dependent species, tidewater goby; and the shallow shorebird habitat currently present in the East Pasture of the Giacomini Ranch.

Primary Project Constraints

In developing a range of feasible alternatives, many factors can act to constrain alternatives' development and implementation. These include legal or regulatory constraints, logistic and technical constraints, and environmental restrictions. Many of these constraints are evaluated as subject topics under impact analysis, but certain critical constraints warranted additional consideration during the process of developing alternatives and restoration and public access actions. These constraints include:

- *Constraint: Flood risks to adjacent private residences and public roads would not be increased above current levels.*

  The Giacomini Ranch and adjoining areas fall within the 100- and 500-year floodplain and experience substantial flooding even during 10-year events. Private residences along Levee Road and Sir Francis Drake Boulevard directly adjacent to the West Pasture flood regularly, as do the county roads themselves. Park Service guidelines for floodplain management, including Executive Order 11988 and National Park Service Director's Order #77-2, direct the direct federal agencies to reduce the risk of flood loss and to minimize the impact of floods on human safety, health and welfare, as well as to restore and preserve the natural and beneficial values served by floodplains.

- *Constraint: Saltwater intrusion conditions into groundwater wells in Point Reyes Station would not exceed current levels, or any increase caused by the proposed project would be mitigated by the project proponents.*

  North Marin Water District (NMWD) operates a municipal groundwater well for the town of Point Reyes Station in an alluvial aquifer directly north of the Project Area. During the summer, when demand is highest, NMWD has experienced salinity intrusion into its groundwater wells as evidenced by chloride concentrations that exceed thresholds established by NMWD (100 mg/L) and, occasionally, recommended Maximum Contaminant Levels (MCL) of 250 mg/L set primarily for aesthetic or taste reasons by the California Department of Health Services. NMWD currently operates under an off-tide pumping regime during high tide events to try and minimize potential intake of chlorides into the alluvial aquifer from saltwater sources. Prior to purchase of the Giacomini Ranch by the Park Service

and during public scoping, NMWD expressed concerns regarding the potential for increased salinity intrusion with removal of the levees and restoration of the Ranch to tidal wetlands.

- *Constraint*: *Impacts to the amount of breeding habitat for the tidewater goby and California red-legged frog would be minimized to the extent practicable. Existing habitat would not necessarily be managed in situ or in current locations, but rather would be allowed to develop elsewhere in response to changes in the hydrologic regime and boundary between salt- and freshwaters following implementation of restoration.*

  During baseline wildlife surveys, breeding populations of the federally-endangered tidewater goby and federally-threatened California red-legged frog were discovered in the Project Area. These brackish and freshwater species have undoubtedly responded at some point in the past to changes in conditions in the Giacomini Ranch and Olema Marsh due to diking and impoundment of freshwater, although brackish- and freshwater habitat has probably always existed to some degree in this transitional estuarine zone. The importance to the Park Service, CSLC, and Audubon Canyon Ranch (which owns a portion of the Olema Marsh) of preserving these special status species is underscored by their inclusion as planning criteria. However, in assigning priority rankings for planning criteria, the Park Service, CSLC, and Audubon Canyon Ranch had to weigh the technical feasibility and advisability of attempting to expand habitats or improve conditions for all special status species given the very different and even conflicting habitat requirements of some of these species and the nature of the landscape being restored. The Park Service mandates parks to protect and to strive to recover all species native to national park system units that are listed under the Endangered Species Act and to manage designated critical and essential habitats for the benefit of listed species (NPS 2006; Section 4.4.2.3). Regulatory constraints regarding special status species are discussed in more detail under the Legislative and Policy Guidance and Constraints section below.

Legislative and Policy Guidance and Other Considerations Used in Developing Purpose and Alternatives

The Park Service mission and policies on management and restoration of natural systems such as wetlands factored substantially into formulation of the project purpose, objectives, and constraints. Legislative, regulatory and policy guidance comes from Park Service-related legislation and policies, CSLC policies, as well as regulations, policies, programs, and plans promulgated by federal, state, and local agencies. These laws, regulations, and policies include the federal Clean Water Act, the state Lake and Streambed Alteration Agreement Process, the federal and state Endangered Species Acts, the California Coastal Act and Local Coastal Program, the Marin Countywide Plan, and the Point Reyes Station Community Plan. Other considerations may also bear on the development of restoration and public access components of the proposed project, such as technical restoration constraints, construction windows driven by wildlife habitat considerations and environmental conditions, and needs and interests of the public, which are discussed separately later in this section. **Those pieces of legislation, regulations, policies, and other considerations and issues instrumental to developing the project purpose, alternative framework, and design of restoration and public access actions are described below.** A complete list of federal and state laws and regulations which the proposed project would need to comply with prior to implementation can be found in Chapter 5.

National Park Service Legislation

National Park Service Organic Act of August 25, 1916 (National Park Service Organic Act, PL 64-235, 16 USC §1 et seq. as amended). On August 25, 1916, Congress created the Park Service with the National Park Service Organic Act. This act, as reaffirmed and amended in 1970 and 1978, establishes a broad framework of policy for the administration of national parks. The purpose of parks is "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

National Park Service Management Policies, 2006. The Park Service Management Policies apply to all units of the national park system, including the Seashore and the GGNRA. Adherence to policy is mandatory unless specifically waived or modified by the Secretary of the Interior, the Assistant Secretary of the Interior, or the Director of Park Service. Sections most relevant to the proposed actions — some of which have been

discussed previously — are Sections: 4.1.4, Partnerships; 4.1.5, Restoration of Natural Systems; 4.4.1, General Principles for Managing Biological Resources; 4.4.2, Management of Native Plants and Animals; 4.4.2.2, Restoration of Native Plant and Animal Species; 4.4.2.3, Management of Threatened and Endangered Plants and Animals; 4.4.2.4, Management of Natural Landscapes; 4.4.4, Management of Exotic Species; 4.6.3, Water Quality; 4.6.4, Floodplains; 4.6.5, Wetlands; 4.6.6, Watershed and Stream Processes; 8.2, Visitor Use; 8.2.4, Accessibility for Persons with Disabilities.

Specific Park Legislation and Policies

The Giacomini Ranch falls within the north district of the GGNRA, although it is managed by the Seashore. Therefore, in developing projects, the Park Service must consider the enabling legislation of both park units.

Golden Gate National Recreation Area. Congress established the GGNRA by Public Law 92-589 "in order to preserve for public use and enjoyment certain areas of Marin and San Francisco Counties, California" (San Mateo County added by P.L. #96-607). In addition to providing for recreation and educational opportunities consistent with sound principles of land use planning and management, the Park Service was also instructed to "preserve the recreation area, as far as possible, in its natural setting, and protect it from development and uses which would destroy the scenic beauty and natural character of the area" (PL 92-598).

Point Reyes National Seashore. Congress established the Seashore on September 13, 1962 "to save and preserve, for purposes of public recreation, benefit and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped (Public Law 87-657)." An amendment to Public Law 94-544 (passed in 1976) states that the Seashore is to be administered without impairment of its natural values. In addition to administering the north district of GGNRA (and therefore the Giacomini Ranch), the Seashore also owns approximately 50 percent of Olema Marsh.

The purpose of national parks is "to conserve the scenery and the natural and historic objects the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Seashore/GGNRA General Management Plans Update. Both the General Management Plans (GMPs) for the Seashore and GGNRA are currently being updated. As with the previous version of the GMP, the new version of the Seashore GMP will include north district GGNRA lands in Olema Valley and Tomales Bay such as the Giacomini Ranch. Scoping for the GMP update has been conducted, and the plan is currently being prepared. The entire planning process is expected to take 4-5 years. In the interim, the park continues to implement the goals and comply with the direction and guidance of the existing GMP prepared in 1980. The proposed project, while not specifically cited in the earlier document, is consistent with the policies of the existing GMP. Actions not covered under the existing GMP are implemented through complying with NEPA and Park Service planning processes.

Seashore Resources Management Plan. The Resources Management Plan (RMP) for the Seashore was updated in 1999. The Plan presents an inventory of natural and cultural resources; describes and evaluates the current resources management program; and prescribes an action program based on legislative mandates, NPS policies, and provisions of related planning documents.

Executive Orders

Executive Orders are issued by the Office of the President and apply to all federal agencies.

Executive Order 11990: Protection of Wetlands. This Executive Order established the protection of wetlands and riparian systems as the official policy of the federal government. It requires all federal agencies

to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance their natural and beneficial values. If a proposed action is found to be in a wetland, the agency shall prepare a wetland assessment, known as a Statement of Findings (Park Service Directors Order 77-1).

Executive Order 11988: Floodplain Management. This Executive Order requires federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains and to avoid development in floodplains whenever there is a practical alternative. Federal agencies are to "…take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." If a proposed action is found to be in the applicable regulatory floodplain, the agency prepares a floodplain assessment, known as a Statement of Findings (Park Service Directors Order 77-2). The Project Area falls within the 100-year and 500-year floodplains and, when levees are removed, has the potential to alter the impact of floods on adjacent lands, homes, and roads, some of which represent important access routes for residents on the Point Reyes Peninsula.

Other Federal Legislation

National Environmental Policy Act (NEPA) of 1970. PL 91-190, 83 Stat. 852, 42 USC §4341 et seq. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences and take actions that protect, restore, and enhance the environment. Regulations implementing NEPA are set forth by the Council on Environmental Quality (CEQ). Additional regulations are provided by the Park Service, including Park Service Director's Order #12, which ensures that the document meets Department of Interior and Park Service standards. The Park Service is the lead NEPA agency and the primary project proponent and manager.

Federal Water Pollution Control Act (Clean Water Act) and subsequent amendments of 1977 (33 USC §1251 et seq.). The Clean Water Act provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 (33 U.S.C. 1344) of the Act prohibits the discharge of fill material into navigable waters, tributaries to navigable waters, and special aquatic sites of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (the Corps) and U.S. Environmental Protection Agency (USEPA). Under Section 401 (33 U.S.C. 1341), states can assume responsibility for Section 401 oversight and can review and approve, condition, or deny all Federal permits or licenses that might result in a discharge to state or tribal waters, including wetlands. This project would potentially involve removal or breaching of levees on creeks, realignment of creeks, and excavation and/or permanent or temporary fill in special aquatic sites such as wetlands. It also has the potential to affect water quality within the Project and in downstream water bodies. Because of this, the project will require Section 404 permits from the Corps and Section 401 certification from the San Francisco Regional Water Quality Control Board. Applications for Section 404 permits and Section 401 certifications would be submitted subsequent to preparation of the environmental document.

Coastal Zone Management Act of 1972, as amended through PL 104-150, The Coastal Zone Protection Act of 1996 (16 U.S.C. §1451 et seq.). This act protects coastal environments and transfers regulatory authority to the states and excludes federal installations from the definition of "coastal zone." Within California, the California Coastal Commission (CCC) administers the state program (California Coastal Act) for implementation of the federal Coastal Zone Management Act (CZMA). Any action by a federal agency such as the Park Service requires a federal consistency determination by the CCC as required by CZMA. The CCC manages fill, dredge, and other non-point activities affecting wetlands within the Coastal Zone. In California, the Coastal Zone is broken into Local Coastal Program (LCP) units that specifically oversee land use and management of resources within their jurisdiction (see section "State and Local Legislation, Policies, and Plans"). This project falls within the Coastal Zone and has wetlands and riparian areas that would be subject to oversight under the Coastal Act and the LCP. The Park Service would make a determination regarding consistency and submit to the CCC for concurrence subsequent to preparation of the environmental document.

Endangered Species Act of 1973, as amended, PL 93-205, 87 Stat. 884, 16 USC §1531 et seq. The Endangered Species Act protects threatened and endangered species from unauthorized "take", and directs federal agencies to ensure that their actions do not jeopardize the continued existence of listed species. Section 7 of the act defines federal agency responsibilities for consultation with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) for fish and marine mammal species. Consultation requires preparation of a Biological Assessment to identify threatened or endangered species that

are likely to be affected by the proposed action. Presence of these species or their habitat affects projects on several levels, specifically proponents:

- must avoid harming listed species either through "take" or through harassment, unless incidental take authorized by USFWS;
- must avoid impacts to habitat deemed as "Critical" to species or must mitigate for impacts to habitat; and
- must avoid undertaking construction and/or maintain a construction buffer during critical seasons such as breeding and nesting when listed species are present.

Several federally threatened or endangered species, as well as Critical Habitat, have been documented in the Project Area. The Park Service and CSLC will be initiating formal consultation with the USFWS and NMFS concurrent with preparation of the environmental document and will design construction phasing so as not to interfere with critical breeding and nesting seasons.

Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §703-712). The Migratory Bird Treaty Act decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The MBTA protects all common wild birds found in the United States, except the house sparrow (*Passer domesticus*), European starling (*Sternus vulgaris*), feral pigeon (*Columbia livia*) and resident game birds such as pheasant, grouse, quail, and wild turkeys (*Meleagris gallopavo*). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 Code of Federal Regulations (C.F.R.) Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). "Taking" is considered disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young). Both special status and common bird species breed and nest in or on the perimeter of the Project Area. Construction would need to be phased to avoid breeding and nesting season, and/or pre-construction bird surveys would need to be conducted.

Magnuson-Stevens Fishery and Conservation Management Act, as amended (PL 94-265, 16 U.S.C. §1801). The Magnuson-Stevens Fishery Conservation and Management Act is the governing authority for all fishery management activities that occur in federal waters within the United States 200 nautical mile limit, or Exclusive Economic Zone (EEZ). One of the potentially applicable components of this act is that it requires conservation and enhancement of Essential Fish Habitat (EFH). Defined by Congress as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity," the designation and conservation of Essential Fish Habitat seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities such as dredging and filling. Species that are regulated under EFH include chinook (*Oncorhynchus tshawytscha*) and coho salmon, both of which have been sighted in Lagunitas Creek, which runs through the center of the Project Area (Figure 2). EFH consultation would occur concurrent with the Section 7 Endangered Species Act consultation with NMFS (see Endangered Species Act above).

Federal Transportation and Access Legislation. In August 2005, President Bush signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) into law. SAFETEA-LU is a comprehensive bill that funds various surface transportation programs at a total of $286 billion over five years and includes many provisions relating to the Park Service, including reauthorization of the Park Roads and Parkways Program (PRPP) and a new alternative transportation program for parks and other public lands. With regards to equitable access, both the Architectural Barriers Act of 1968 (PL 90-480) and the Americans with Disabilities Act (ADA) of 1990 (PL 101-336) help to ensure that buildings and other facilities meet set standards to make them accessible to all visitors, including those with disabilities. The Park Service complies with ADA standards and, in order to provide the maximum opportunity for visitors to experience national parks, follows the stricter of either the Americans with Disabilities Act Accessibility Guidelines (ADAAG; 36 CFR part 1191) developed in 1991 or the Uniform Federal Accessibility Standards (UFAS) established in 1984. Standards for outdoor recreational facilities such as trails often follow recommendations issued in September 1999 by a special regulatory negotiation committee convened by the Architectural and Transportation Barriers Compliance Board (Access Board). Based on these guidelines, the Park Service requires that walks or paths that connect to accessible features and that key features in the park need to be made accessible while being kept consistent with preserving the natural and cultural resources of the park. Public access is proposed as part of this project and is subject to these standards. This project could involve construction of trails on state and county lands and so require compliance with the more stringent handicap access standards of the California Building Code, Title 24 regulations, although the Title 24 standards are intended for urban facilities and not necessarily rural and park-type trails.

State and Local Legislation, Policies, and Plans

Federal projects are not subject to state and local legislation, unless state and local authorities have assumed authority for a federal law (i.e., Section 401 of the Clean Water Act, the Coastal Zone Management Act). However, as this is a joint federal and state project, it must comply with all applicable state and local legislation on state- and county-owned lands.

California Environmental Quality Act (Public Resources Code §21000 et seq.). CEQA is the California equivalent of NEPA that applies to projects undertaken or requiring approval from state and local governments. While many aspects of CEQA are similar to NEPA, there are some differences, including in terminology, structure of the environmental document required, noticing, evaluation and analysis of alternatives, and requirements regarding mitigation for significant environmental effects. In addition, CEQA provides that all species of concern (e.g., any species considered at-risk by the California Native Plant Society) be considered as protected, regardless of appearance on a formal federal or state Endangered Species Act (ESA) lists (State CEQA Guidelines, Section 15380 (b)(d)). The lead CEQA agency for this project is the CSLC.

Porter-Cologne Act (California Water Code, Division 7, §13000). The Porter-Cologne Act is the principal law governing water quality control in California. It establishes a comprehensive program to protect water quality and the beneficial uses of waters of the State. The Porter-Cologne Act applies broadly to all State waters, including surface waters, wetlands, and ground water; it covers waste discharges to land as well as to surface and groundwater, and applies to both point and non-point sources of pollution. The Regional Water Quality Control Boards (RWQCB), which also administer Section 401 of the federal Clean Water Act, govern the nine hydrologic regions into which California is divided, adopting regional water quality control plans (basin plans) for their respective regions. Water quality control plans designate beneficial uses of water, establish water quality objectives to protect those uses, and provide a program to implement the objectives. This project has the potential to affect surface waters and could therefore require certification from the San Francisco RWQCB under Section 401. In addition, the San Francisco RWQCB has established beneficial uses and associated water quality criteria for Tomales Bay and Lagunitas Creek, which runs through the Project Area (Figure 2).

California Endangered Species Act (Fish and Game Code, § 2050 et seq.). Similar to the federal government and the Endangered Species Act, the state of California has designated certain wildlife and plant species as endangered, threatened, or rare. Regulation of activities affecting these species is handled by the California Department of Fish and Game (CDFG). Sections of the Fish and Game Code prohibits "take" of any species that the commission determines to be an endangered species or a threatened species; the take, possession, or destruction of birds, their nests or eggs; and/or disturbance that causes nest abandonment and/or loss of reproductive effort. Both federally and state-listed endangered and threatened species occur in the Project Area and vicinity. Project proponents will consult with CDFG for species occurring on state, county, and private lands and, if necessary, initiate a permitting process subsequent to preparation of the environmental document. Construction would also be phased to avoid breeding and nesting season, and/or pre-construction surveys would be conducted.

County of Marin Countywide Plan Update (2005). The County of Marin is currently in the process of updating its Countywide Plan (CWP; Marin County Community Development Agency). The purpose of the Plan Update is to set policy guidelines for future conservation and development in the county and to address changed conditions since the last revision of the CWP. The CWP establishes an overall framework and set of goals for countywide development in the unincorporated area of the County. The draft CWP establishes a number of policies aimed at protecting and restoring natural resources, preserving existing parklands and values, preserving the rural character of West Marin, maintaining a viable agriculture and mariculture industry where it exists, and improving transportation conditions through reducing traffic and promoting alternative transportation such as bicycles. It also makes reference to the need for pedestrian and bicycle trail in the vicinity of the Giacomini Ranch, Point Reyes Station, and Inverness Park.

Marin County Local Coastal Program, Unit II (LCP). In 1976, the California Legislature enacted the Coastal Act, which created a mandate for coastal counties to manage the conservation and development of coastal resources through a comprehensive planning and regulatory program called the Local Coastal Program (LCP; Marin County Comprehensive Planning Department 1981). The LCP govern decisions that determine the short and long term conservation and use of coastal resources. In general, within the Coastal Zone, the LCP supersedes any other county or local ordinances. The Project Area occurs in Marin LCP Unit II. The LCP

policies require protection, enhancement, and restoration of environmentally sensitive habitats (including wetlands and riparian habitat); protection and expansion of public access to the shoreline and recreational opportunities and resources; protection of the scenic coastal landscape; and protection of productive agricultural lands. In addition, the LCP supports the concept of a public access route within certain portions of the Project Area and establishes a buffer for protection of the Point Reyes Mesa bluff area within and immediately adjacent to the Project Area. As noted earlier, the proposed project would require federal consistency review by the California Coastal Commission (See Coastal Zone Management Act under Federal Environmental Legislation).

Point Reyes Station Community Plan (2001). The Point Reyes Station Community Plan (Marin County Community Development Agency 2001) establishes objectives and policies and programs for a number of land use, socioeconomic, and natural resource issues within the unincorporated area of Point Reyes Station. Several of the natural resource objectives specifically pertain to the Giacomini project, specifically:

- support for restoration of the former tidal marshes at the headwaters of Tomales Bay to natural conditions and protection of the restored wetland in the future through review of development projects or construction activities in consultation with the Park Service and other relevant public agencies and incorporation of either impact avoidance or mitigation measures;
- preservation of the physical, ecological, and visual integrity of the bluff area located above the old railroad right-of-way through the development review process establishment of a 100-foot buffer zone extended eastward from the eastern edge of the railroad grade;
- preservation of streams and streamside environments in their natural conditions, including protection of existing riparian habitat or "buffers" and removal of invasive plant species;
- protection and restoration of Tomasini Creek through allowing the downstream portion to resume its natural slough channel west of Mesa Road, thereby promoting recolonization by steelhead; and
- protection of Lagunitas Creek, specifically its water quality, coho salmon and steelhead populations, and other aquatic life.

Marin County Unincorporated Area Bicycle and Pedestrian Master Plan (June 2001). This document includes several proposed bicycle and pedestrian projects in various parts of the unincorporated area of Marin, including in or near the Project Area. The proposed trails or bikeways in or near the Project Area would connect 1) Point Reyes Station to Inverness (Proposed Trail #4 in the plan) and 2) Point Reyes to Marshall (Proposed Trail #6 in the plan; Alta Transportation Consulting 2001).

Other Considerations

Technical and Logistic Considerations. One of the largest considerations in developing a tidal wetland restoration project is existing topography. These existing topographic conditions largely dictate the approach or framework for restoration and the type of specific restoration actions that are undertaken. Should an area be greatly subsided or its surface elevations dropped significantly since diking, the plan for restoration would often require a longer-term approach that involves either bringing in sediment or encouraging natural sedimentation to create wetlands in what would otherwise be an open water area. In areas that have aggraded or become higher in elevation since levee construction, such as the Project Area, the primary technical consideration often involves getting rid of enough sediment to effect restoration, which poses both logistical and funding constraints on project development. Sediment excavation is not only inherently costly, but, in restoration projects, the goal would be to remove most of this excavated material off-site, which can be costly and have impacts on local and regional traffic patterns and roads. Ultimately, restoration projects involving aggraded areas are often constrained in the amount of material that can be excavated and moved off-site, because of associated costs and traffic impacts.

In addition to topographic conditions, the development of wetland restoration projects is also driven by possible contamination uses from past site uses and construction "windows" that often require phasing of projects over a number of years. The construction windows during each year of construction are dictated by site conditions (area dry enough to allow equipment access), onset of the rainy season (permits often restrict construction during wet conditions), and spatial and temporal constraints associated with breeding, nesting, or rearing of special status and migratory bird species (permits often restrict construction or require sizeable buffer during breeding and nesting season, which varies according to species).

Existing topographic conditions largely dictate the approach or framework for restoration in tidal wetland restoration projects and the type of specific restoration actions that are undertaken.

Issues and Concerns Raised During Scoping

Public, Agency, and Internal Scoping Process

Under NEPA and CEQA, project planning begins with scoping: a determination of the bounds and purposes of the project. Scoping is conducted with involvement of agencies and the interested public and is intended to "insure that real problems are identified early and properly studied; that issues that are of no concern do not consume time and effort; that the draft statement when first made public is balanced and thorough; and that the delays occasioned by re-doing an inadequate draft are avoided" (Council on Environmental Quality 1981).

A preliminary list of potential scoping issues was first developed through internal scoping, including meetings and a site visit with Park Service staff to the Project Area. A public scoping meeting was held on October 19, 2002, at the Dance Palace in Point Reyes Station. The Seashore also held a meeting with federal, state, and local agencies and organizations in early November 2003. The public and agencies were also encouraged to voice concerns about potential issues during a formal public comment period that followed the two meetings. A more detailed discussion of public scoping can be found in Chapter 5.

Additional Public and Agency Comment and Input after Scoping

Because scoping is considered an ongoing process in the Park Service, the Park Service and CSLC continued efforts at early involvement by holding a series of internal Park Service meetings, as well as workshops with agencies and the public in 2004 to get feedback on the range and appropriateness of the preliminary restoration and public concepts developed. In early 2004, the Park Service and CSLC conducted workshops with agencies and adjacent landowners to present preliminary alternatives and solicit input. The culmination of these series of alternative workshops was an alternatives workshop for the general public, held on June 22, 2004. Public input on the range and appropriateness of alternatives was solicited both through a question-and-answer period, as well as break-out groups to encourage more detailed discussion. In addition, comment in the form of letters and emails following the workshop was also encouraged. A more detailed discussion of post-scoping public outreach efforts can be found in Chapter 5.

Scoping Issues and Concerns

Issues and concerns raised during scoping and informal public comment provide the basis for the selection of the "impact topics" that will be addressed in the environmental consequences section of this FEIS/EIR. Listed below are some of the major topics raised during public scoping and informal public comment. A more detailed description of issues and concerns raised can be found in Chapter 5.

- Need within the community for improved and safer public access and the compatibility of public access with restoration.

- Effect on wetland, riparian, and upland ecotone habitats;
- Short-term and long-term effects on water quality within the Tomales Bay watershed;
- Effect on flooding of adjacent roads and homes;
- Effect on salinity intrusion into local municipal groundwater wells;
- Effect on special status plants and animals, including salmonids, California red-legged frog, tidewater goby, and rails.
- Inclusion of Olema Marsh in proposed project
- Potential impacts on adjacent landowners and the character of the local community, including potential increases in traffic, noise, and parking problems;
- Potential impacts to local agriculture from land conversion;
- Effects on public health in the local community from disease vectors such as mosquitoes.

Public Review of DEIS/EIR

The federal Notice of Availability for the DEIS/EIR was published in the Federal Register on November 3, 2006. A notification that the DEIS/EIR had been filed with the USEPA (EIS No. 20060502) was published on December 15, 2006. A notice that the DEIS/EIR had been filed with the State Clearinghouse (SCH # 2002114002) was published on December 18, 2006.

A public meeting was held to discuss the alternatives and potential benefits and impacts of the proposed alternatives on January 25, 2007. More than 100 members of the public attended the meeting. The approximately 60-day period for comments for the public comment period closed February 14, 2007. Approximately 187 individuals, organizations, and agencies mailed, faxed, or emailed comments regarding the proposed project. On March 2, 2007, the USEPA published its findings on review of the draft EIS/EIR as Lack of Objection (LO), noting that the "EPA supports the proposed project and believes it will significantly improve the hydrologic and ecological processes and functions in the Tomales Bay Watershed." A more detailed description of the public and agency comment and Park Service and CSLC response can be found in Chapter 5.

Impact Topics Analyzed in this FEIS/EIR

The purpose of an environmental document is to evaluate and compare the effect or impact that a range of potential project alternatives could have on the human environment. The Council on Environmental Quality, which provides guidance for preparation of federal environmental compliance documents, defines the "environment" as not only natural resources, but human-related ones, including topics such as public health and safety, socioeconomics, and environmental justice, etc. The potential effect of a project is determined by separating the "environment" into related impact topics such as geology, soils, vegetation, public health and safety, public services, socioeconomics, etc., which are then individually assessed relative to the range of alternatives to ascertain and compare potential project impacts.

Impact topics included in this FEIS/EIR are described below: they were selected on the basis of internal, public, and agency scoping and baseline studies and are the areas where the Park Service and CSLC staff believe negligible to major impacts might occur from implementing one of the proposed alternatives. Baseline or existing conditions for these impact topics are described in detail for the Project Area and surrounding region in Chapter 3, Affected Environment. Potential impacts resulting from implementation of any of the proposed alternatives is the subject of an entire chapter, Chapter 4, Impact Analysis.

General and Agricultural Land Use

While conservationists halted large-scale development plans in west Marin in the 1960s, helping to create the Seashore in the process, the region continues to struggle with land use issues into the new century. Since the 1800s, west Marin has supported dairy and beef cattle ranches and was once identified as one of the leading dairy regions in California. Market dynamics of an increasingly globalized economy, however, are threatening the ranching way of life in this rural enclave of the San Francisco Bay region. In addition, the strong housing

market in Marin and elsewhere in the San Francisco Bay area continues to place pressure on undeveloped areas within the county, although approximately 48 percent of this county has already been protected as park, open space, or water district lands. West Marin comes under the purview of several land use plans that are trying to balance economic viability with preservation of scenic, natural resource, and agricultural values, including the Marin Countywide Plan, the Local Coastal Program, and the Point Reyes Station Community Plan. In addition, activities in lands of the Seashore and north district of GGNRA are also guided by internal Park Service documents such as the General Management Plan, which is currently being updated, and the Resource Management Plan. The local community plan supports restoration of the Giacomini Ranch (Point Reyes Station Community Plan; Marin County Community Development Agency 2001), however, the proposed project has generated some concerns among members of the community with regards to how it might affect the character of these rural and highly popular tourist destination towns. In addition, discontinuation of the Giacomini Ranch has the potential to affect local agriculture and agricultural land uses in the vicinity of the Project Area.

Geologic Resources

The Seashore and adjacent GGNRA lands are geologically unique. Geology plays a critical role in wetland formation and maintenance. Geologic conditions within Tomales Bay, which is formed on the San Andreas Fault rift valley, are largely defined by the movement of the Pacific and Continental plates along the San Andreas Fault, as well as coastal-dominated geologic processes associated with sea level rise and retreat. The San Andreas Fault runs directly through the Project Area, overlapping in areas with either the current or historic course of Bear Valley Creek and Lagunitas Creek in this portion of Tomales Bay. As of 1862, most of the southern and eastern portions of the Giacomini Ranch were low-lying intertidal marsh, with the northwestern portion largely subtidal and intertidal lands. However, excessive sedimentation from logging and other land use disturbances during the late 1800s-early 1900s greatly accelerated sediment transport and deposition, resulting in almost a doubling of wetland acreage within Tomales Bay (Parsons et al. 2004c) and nearly 5 feet of vertical soil accumulation in southern portions of the watershed (PWA et al. 1993). Despite construction of levees in the 1940s, the vertical elevation of the Project Area has dropped little due to subsidence or compaction of soils. The proximity of the Project Area to the fault and Pacific Ocean may change the potential for impacts from catastrophic geohazards such as surface fault rupture, liquefaction, landslides or tsunamis resulting from implementation of certain project components such as public access. Project implementation would also involve changes to the Project Area topography, largely through grading and excavation.

Soil Resources

This region's unique geology has also created a complex mosaic of soil and bedrock formations within Seashore and north district GGNRA lands. These soils play an integral role in wetland functions such as water quality improvement by binding and/or transforming nutrients, pathogens, and contaminants. As of 1862, most of the southern and eastern portions of the Giacomini Ranch and Olema Marsh were largely classic intertidal marsh soils composed of tidally derived estuarine muds and peat. A period of rapid and excessive sedimentation from erosion in upper portions of the Lagunitas Creek and other Tomales Bay subwatersheds during the late 1800s-early 1900s, however, converted the Giacomini Ranch to a fluvial or creek-dominated sediment deposition environment, with influx of substantial amounts of silts, sands, and gravels. Conversely, the Olema Marsh is still underlain by a thick layer of peat soils that is promoted currently by long-term water impoundment and associated reduction in rates of organic matter breakdown.

Deposition of alluvial materials has created soil types that are attractive for agricultural use. The southeastern 156.5 acres of the Giacomini Ranch has been mapped as having Farmland of Statewide Importance soils, with the remainder of the ranch and Olema Marsh mapped as Farmland of Local Importance soils (California Department of Conservation 2002). Areas with these types of soils receive special protection from both federal and state agricultural agencies that are designed to minimize conversion of agriculturally important farmland. Soil resources can be impacted by excessive nutrients from high intensity cattle grazing or manure spreading or from excessive influx of contaminants such as lead or mercury. Heavy equipment would be used to remove levees and create or enhance habitat features, remove roads and infrastructure, fill ditches, and construct public access infrastructure, thereby potentially disturbing soil resources. In addition, excavation may disturb soils that are high in nutrients or contaminants.

Air Resources

While air resources are rarely the primary resource drawing visitors to parks, they highly influence visitors' enjoyment of other park resources. Air resources within marine-influenced, rural West Marin are above average in quality, particularly when compared to the more urbanized areas of San Francisco Bay, however, air quality can be negatively affected by activities both inside and outside of the Seashore. The use of heavy equipment during construction can increase short-term production of pollutants, such as exhaust and dust, depending on incorporation and adherence to standard Best Management Practices (BMPs). Construction projects also have the potential to impact natural soundscapes. The Project Area is adjacent to a rural community where quiet is highly valued by residents and visitors. Heavy equipment would be used during construction and may therefore, temporarily affect existing soundscapes depending on incorporate and adherence to standard BMPs. Long-term, the proposed project could impact both air quality and soundscapes through potential increases in traffic and noise associated with changes in visitation rates.

Water Resources – Hydraulics and Hydrologic Processes

The complex geologic setting of the Seashore has resulted in an equally complex hydrologic setting, characterized by tides, creeks with seasonal and perennial water flow, and abundant groundwater from springs and seeps. The Project Area lies at the upstream end of the Tomales Bay estuary. Hydrologic and geomorphic processes such as flooding and sediment transport are integral to wetland functions such as floodwater retention, dissipation of flood flow energy, water quality improvement, groundwater recharge, and export of food to marine and estuarine organisms. The influence of tides, creeks, and groundwater in the Project Area has been adversely impacted by levees, culverts, tidegates, flashboard dams, ditching, and realignment of creek channels. This project is focused primarily on improving natural hydrologic processes within the Project Area through breaching or removal of levees, removal or modification of culverts, removal of tidegates, elimination of ditches and ditching practices, excavation of new tidal creeks, realignment of creek channels, although construction of public access trails and bridges has the potential to adversely affect hydrologic process. Over the long term, hydrologic processes and functions within Tomales Bay and the Project Area may be affected by sea level rise, which recent scientific information suggests may be occurring at a faster rate than originally predicted.

Water Resources – Water Salinity and Water Quality

One of the more important hydrologic functions of wetlands is water quality improvement. As noted earlier, this project is focused primarily on improving natural hydrologic processes and functions within the Project Area. The Project Area occurs in the estuarine transition zone, which is very dynamic hydrologic environment in terms of salinity with water salinities very low during the winter and spring and higher, sometimes almost at marine concentrations, during the late summer and fall. Currently, water quality currently within the Project Area is not highly eutrophic, although there are episodic spikes in concentrations of nutrients such as nitrates and ammonia and consistently high levels of pathogen indicator bacteria such as fecal coliform. Fecal coliform levels are also elevated in sections of creeks in the Project Area such as Lagunitas and Bear Valley that are downstream of other dairies or agricultural operations. In addition, some ditches in the Giacomini Ranch have chronically low levels of oxygen in the water that affects the ability of aquatic organisms such as invertebrates and many fish species to persist.

Point Reyes' historic preeminence as a coastal dairy ranching region has contributed along with other factors, such as leaking septic systems and discharge of bilges on boats, to water quality problems in the Tomales Bay watershed. Tomales Bay and some of its subwatersheds have been declared impaired by the San Francisco RWQCB under Section 303(d) of the Clean Water Act for sediments, nutrients, pathogens, and/or mercury. The proposed project has the potential to affect water quality both in the Project Area and in Tomales Bay through changes in land management practices and removal or modification of infrastructure that reduces hydrologic connectivity between the Project Area, source creeks, and Tomales Bay. During construction and shortly after the proposed project is completed, there is some potential for short-term adverse impacts to water quality during flooding when sediments on marshplains that were disturbed by earthmoving are suspended into floodwaters and carried downstream.

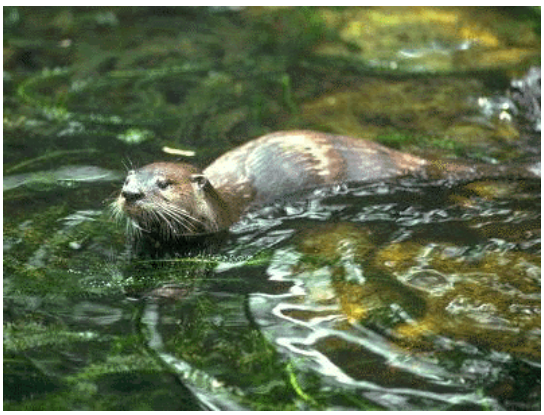
Vegetation Resources

The complexity of geologic and hydrologic resources within the Project Area is associated with an extremely high diversity of vegetation communities and plant species. Most of the vegetation communities present in

the Project Area have remained wetland or riparian in nature despite diking and disturbances from other land management activities. However, the type of wetland has changed greatly, with salt and brackish marsh being converted in both the Giacomini Ranch and Olema Marsh to freshwater wetlands such as Wet Pasture and Freshwater Marsh. The extent of riparian habitat has been reduced dramatically by land management practices such as levee and culvert maintenance, as well as by grazing on the Giacomini Ranch and possibly increases in water levels in Olema Marsh. Wetland and riparian habitats are integral components of many wetland functions, such as reducing the erosive power and height of flood flows, filtering pollutants out of water, providing food and habitats for both resident and non-resident wildlife species, including endangered or threatened wildlife species. The Project Area supports several plant species that are of federal, state, and local concern. By reestablishing natural tidal and freshwater hydrologic processes, the proposed project has the potential to change the type and quality of habitats that are present, including the quality and potentially the extent of wetlands and habitat for special status plant species and non-native invasive species. In addition, construction also has the potential to cause a temporary or short-term change in existing conditions for vegetation, wetlands, and special status plant species.

Fish and Wildlife Resources

One of the most important functions that wetlands and riparian habitats play is to provide food chain support and habitat for wildlife, both common and special status species. While the Project Area supports resident and non-resident wildlife, some of which are even special status species, the functionality of diked wetlands for wildlife is typically lower than that of undiked wetlands. Many wildlife species are attracted to the mosaic of habitats that occur on the Giacomini Ranch's perimeter, utilizing salt marsh, freshwater marsh, riparian habitat, and even pasture (ARA 2002). Olema Marsh's expansive freshwater marsh and fringing riparian habitat supports numerous breeding birds in the spring and waterfowl in the fall and winter. However, in general, habitat diversity in the Giacomini Ranch and even Olema Marsh is low, with most of the Giacomini Ranch covered by a monotypic community of wetland grasses and herbs. In addition, levees and poor hydrologic connections with downstream water bodies allow limited export of food resources from the Project Area and use of the Project Area by marine and estuarine species in Tomales Bay.



Southwestern River Otter

Some special status wildlife species appeared to have established as a result of the minimization or elimination of tidal influence. The Project Area is home to one federally endangered species, one federally threatened species, and several species of federal, state, and local concern, including the California red-legged frog (federally threatened), northwestern pond turtle (*Clemmys marmorata marmorata; species of concern for the Sacramento USFWS District*), and tidewater goby (federally endangered). The removal of levees not only has the potential to negatively affect species adapted to freshwater or brackish water, but may allow introduction and/or spread of invasive wildlife species such as the European green crab (*Carcinus maenas)*, which has been sighted in the undiked areas adjacent to Giacomini Ranch and possibly in the Giacomini Ranch West Pasture. The proposed project focuses specifically on improving wetland functions, including support and habitat for wildlife. However, construction has the potential to cause adverse impacts during construction to species and their habitat, particularly aquatic species, depending upon the implementation and adherence to BMPs designed to avoid or reduce temporary and short-term impacts on migratory and special status wildlife species and their habitats.

Cultural Resources

The history of Native American settlement, European exploration, and historic-era colonization of the Seashore and GGNRA has left a legacy of valuable archeological and historic resources. Cultural resource and historic structure surveys did not identify any archaeological resources or human remains in the Project Area. Several cultural landscape features were identified and recorded, including a historic-period railroad bed, a historic-period levee system and dam, and two manure ponds near the Dairy facility (Newland 2003; Garcia and Associates 2004).. The dam was a temporary gravel structure that the Giacominis installed each summer to

provide some freshwater for irrigation purposes, but installation was discontinued prior to selling the property to the Park Service. The consultants and the Park Service have determined that none of these features qualify for listing as a historic structure by the State Historic Preservation Office (SHPO): The Park Service will be coordinating with SHPO to obtain concurrence with these determinations. Some of the alternatives include filling and grading of the manure ponds, and one of the public access components would involve either placement of dirt fill or installation of an elevated boardwalk on the historic railroad grade.

Public Health and Safety

As with many other parks in developed regions, the Seashore and north district GGNRA are not isolated preserves, but rather integrated components of larger communities comprised of a mix of private, County, state, and federal ownership. In developing projects in parks such as these, the Park Service not only needs to consider the health, safety, and welfare of park visitors and employees, but the local community as a whole. Some of the most important public health and safety issues for visitors, staff, and the local community are flooding and the potential for transmission of disease through vectors such as mosquitoes that breed in natural and artificially created wet areas such as livestock ponds and ditches. Situated at the confluence of several large creeks (Lagunitas, Olema, and Bear Valley), the Project Area and vicinity are located within the 100-year floodplain and have been subjected to numerous devastating floods during the last 100 years, including the 1982 flood, the 1998 flood, and, most recently, the 2006 flood. In areas where levees are removed, flooding can be a concern. However, one of the hydrologic functions that the proposed project hopes to restore is reduction in flooding of adjacent homes and roads by hydrologically reconnecting Lagunitas Creek and some of the other tributaries to their historic floodplains on the Giacomini Ranch and Olema Marsh. In addition, increasing connectivity of creeks with wetlands and riparian habitats has the potential to dissipate or dampen the erosive energy of flood flows. While wetlands offer benefits to humans and wildlife, they also raise concerns about the potential for increase disease vectors such as mosquitoes that carry diseases such as West Nile Virus, which poses a significant health risk to seniors, children, and immuno-compromised individuals. Because of concerns about West Nile Virus and other mosquito-borne viruses, West Marin was recently annexed into the Marin-Sonoma Mosquito and Vector Control District.

Public Services

Wetlands can benefit public services such as municipal groundwater supply through playing an instrumental role in recharge of groundwater systems. However, while increasing floodwater retention and water quality improvement potential, reestablishing tidal hydrologic processes has the potential to increase the total volume of tidal waters within southern Tomales Bay and the amount of saltwater moving up Lagunitas Creek to the North Marin Water District (NMWD) municipal groundwater wells near the Coast Guard facility in Point Reyes Station. NMWD is already forced at certain times during the summer, when freshwater flows drop and water demand increases, to temporarily shut off one of its wells to minimize the historical salinity intrusion problems that it has had with its well system, which serves the town of Point Reyes Station, Inverness Park, and other local areas. Unlike the municipal water supply system, most of the residents of West Marin rely on individual on-site wastewater treatment disposal systems. Because some private homes adjoin the West Pasture of the Giacomini Ranch, some of these systems could be affected by changes in tidal and freshwater hydrologic processes. The proposed project may also affect traffic and transportation in the local community. Most of West Marin is served by a network of two-lane highways and roads, some of which serve as the only route that provides access to certain areas. Not only would construction potentially have temporary impacts on community residents, visitors, Seashore staff, and emergency staff through movement of construction equipment and excavated soils, but the proposed project might have long-term impacts on traffic by increasing the amount of visitors coming to the Point Reyes Station-Inverness Park area to view the completed restoration project and use public access facilities.

Visitor and Resident Experience

Enjoyment of park resources and values by the people of the United States is a fundamental purpose of all parks. Park visitors go to national parks for natural beauty, a sense of quiet, and opportunities to enjoy physical activities such as hiking, camping, swimming, kayaking and canoeing, rafting, fishing, skiing, climbing, bird-watching and other wildlife viewing, as well as to learn about the important events or periods in our past through historic landmarks, museums, and other facilities. With more than 50 percent of its lands in public ownership or conservation easement, Marin County is one of the leaders in the San Francisco Bay region in terms of providing access to both residents and visitors. While many parks primarily serve visitors

who come from outside the park's region, the majority of the 2.5 million visitors who come to the Seashore each year live in the San Francisco Bay area. In 2002, more than 700,000 visitors visited the three Seashore visitor centers, and more than 70,000 visitors had extended contacts with park interpretative staff through ranger-led programs.

Because the Giacomini Ranch has been privately owned until recently, the only formal trails are those on lands owned by the Seashore and GGNRA and lands managed by the County of Marin Parks and Open Space District. There has been little formal trail development in the Project Area, however, several informal trails have established along portions of the Giacomini Ranch's levees and are used for walking, dog-walking, bird-watching, and other passive recreational pursuits. The Park Service and CSLC have carefully worked to incorporate opportunities to experience and enjoy the restoration process through public access, which is one of the project objectives. However, the proposed project has the potential to affect some or all of the existing public access and viewshed resources in the Giacomini Ranch and Olema Marsh and may have temporary impacts on park visitors, local residents, and staff through increases in construction-related traffic and potential temporary closures in roads.

Socioeconomics

The Seashore is one of the 30 most visited parks in the National Park system. It is a destination park for national and international visitors, as well as a regularly visited resource for the 5 million residents of the nine counties that comprise the greater San Francisco Bay Area. Marin County has a $500 million annual tourist industry, and it is estimated that the Seashore contributes over $150 million to the regional economy visitor expenditures on dining, fuel, gifts, groceries, and lodging (NPS 2002). The proposed project has the potential to affect socioeconomics of the local community and the West Marin region through changes in visitation to the towns of Point Reyes Station and Inverness Park, which are reliant to some degree on tourism for economic viability. In addition, construction activities has the potential to have short-term adverse impacts on visitation to the Project Area and region by increasing construction-related traffic and traffic delays on roads or causing temporary road closures.

Park Management and Operations

Parks must take into consideration the impact of proposed projects on park management and operations, including staffing and budget. Most parks receive operations funding through Congressional appropriation, although some parks receive monies from revenue generated from park entrance fees, etc. The proposed project has been funded differently than many other park programs or projects, in that it has received a majority of its funding from non-park sources, including mitigation monies from CalTrans and other settlement funds and grants from private non-profit organizations. This funding has been and would be used for acquisition of the Giacomini Ranch, planning and permitting, and construction. While construction of the project is being funded with non-Park Service monies, the proposed project has the potential to affect park staff and the management and operations budget through maintenance and management of the property and public access components after implementation is completed.

Impact Topics Dismissed from Further Assessment

The following impact areas or topics analyzed during scoping would not appear to be affected by the proposed project, or the effects would be at the lower limits of detection. These impact topics or areas are dismissed from further assessment in the FEIS/EIR and are listed and described below.

Unique Ecosystems, Biosphere Reserves, World Heritage Sites

The Project Area is located along the coastal margin of the Golden Gate Biosphere Reserve, which encompasses the Seashore, the GGNRA, and portions of the central California coast south of the GGNRA. Acreage of lands in the biosphere totals approximately 523,906 acres. It extends from Bodega to Jasper Ridge south of San Francisco and out from the shore approximately 30 miles to the edge of the Continental Shelf and includes the Farallon Islands. Because of the overall size of the biosphere, the proposed project would be expected to have a non-detectable or negligible effect on the Golden Gate Biosphere Reserve.

Environmental Justice in Minority and Low Income Populations

In 1994, President Clinton issued Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This EO requires that federal agencies make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. A proposed project could have a major or substantial effect on Environmental Justice if it were to disproportionately affect minority or low-income members of the community or tribal resources. Based on 2000 census data for Marin County, Point Reyes Station, the largest town adjacent to the Project Area, is approximately 87.3 percent white, 9.3 white Hispanic or Latino, and 3.4 percent other races. The Federated Indians of Graton Rancheria, which recently became federally recognized, once had traditional lands in the vicinity of the Project Area, but there are no current land holdings in the Project Area. The proposed project would have no impact on Environmental Justice, because minority and low income populations are weakly represented in West Marin and the Point Reyes Station areas, and the proposed project would not be expected to adversely affect the health or environment of minority and low income peoples present.

Tribal Land Use and Sacred Sites

The proposed project would not have an effect on tribal land use or sacred sites. Surveys were conducted as part of baseline studies for the proposed project (Newland 2003), and no potential sacred sites were found to exist in the Project Area.

Energy Resources

The proposed project would only have a very slight effect on the sustained use of energy within the region. The action alternatives involve use of heavy equipment for one construction season. The proposed project does not involve the sustained use of energy supplies. The action alternatives would have a short-term, negligible adverse affect on energy resources. Closure of the dairy would be expected to reduce long-term energy demand at the Giacomini Ranch through discontinuation of large water pumps, as well as mechanical equipment associated with the Dairy facility.

Long-Term Management of Resources and Land/Resource Productivity

The proposed project is consistent with long-term general management plans for the Seashore and the GGNRA and would, therefore, have no effect on long-term management of resources.

Chapter 2

Alternatives, including the Preferred Alternative

Overview of Alternatives

The following five alternatives have been developed for the Giacomini Wetland Restoration Project FEIS/EIR:

- ***No Action Alternative*** – Management of Project Area as Specified Under Current Management Plan and Existing Agreements, Including Mitigation as Required by Existing Mitigation Agreement and Maintenance of Existing Public Access Facilities
- ***Alternative A*** – Limited Restoration of the Giacomini Ranch East Pasture Only with Expanded Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter;
- ***Alternative B*** – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter;
- ***Alternative C*** – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access;
- ***Alternative D*** **(Environmentally and Agency- Preferred Alternative)** – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access

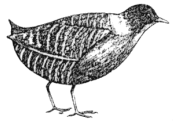
Project Planning and Alternatives Development Process

NEPA and CEQA require project proponents to identify a range of reasonable project or action alternatives within an EIS/EIR. Reasonable action alternatives must be economically and technically feasible and demonstrate common sense. With the exception of the No Action alternative, alternatives must meet, to a large degree, stated purpose and objectives for taking action and should not conflict with federal, Park Service, state, and local laws, regulations, and policies or constraints identified during scoping. A No Action – or No Project – alternative must be analyzed under NEPA and CEQA: this alternative evaluates future conditions under existing management plans or agreements and allows the public to evaluate the implications of what would happen if no project were implemented.

Reasonable action alternatives must be economically and technically feasible and demonstrate common sense

Since purchasing the property in 2000, the Park Service and CSLC have conducted a comprehensive NEPA/CEQA planning process that has involved extensive interaction with the public and agencies, as well as completion of numerous resource studies. Information from scoping and baseline studies was used to develop preliminary alternatives and refine them for eventual inclusion in this document. The project planning process started in 2001, with initiation of baseline studies designed to assess existing conditions and resource values of the Giacomini Ranch. These studies included topography, hydrology, wildlife (birds, fish, invertebrates, etc.), plants, vegetation communities such as wetlands and riparian habitat, water quality, sediment contaminants, and cultural resources such as archaeological sites and historic structures. This information is crucial to not only understanding existing conditions, but potential constraints on design of restoration and other components of the project.

For example, in developing wetland restoration projects, one of the important initial considerations involves topography within the Project Area and adjacent properties. The Park Service contracted with the U.S. Geological Survey to produce a topographic map of the Project Area. Results of the topographic survey provided project proponents with several important pieces of information. First, elevations within the Giacomini Ranch are higher than most diked wetland areas such as in San Francisco Bay or the Sacramento Delta, which are often extremely low topographically due to subsidence or decreases in surface elevations from compaction of soils and/or breakdown of undecomposed organic material (peat). Elevations range from +2 to +12 feet NAVD88 in the Giacomini Ranch. These topographic conditions within the Project Area would place some significant logistical constraints on using historic conditions as a framework



for restoration or alternative design, because the amount of excavation required to return the Giacomini Ranch to subtidal-low intertidal conditions that were present in the 1860s would be prohibitive.

Secondly, unlike restoration of deeply subsided diked wetlands, removal of levees in the Project Area would not necessarily create open water conditions, but rather would favor almost immediate establishment of mid- to high marsh and even upland communities. Olema Marsh is also higher in elevation than was assumed at first, although, in this case, higher elevations have been maintained by a substantial build-up in peat due to the fact that permanent flooding precludes breakdown of organic material (KHE 2006a). This topographic difference between the Project Area and other diked wetlands has significant implications for design and phasing of restoration. The lack of subsidence greatly increases the feasibility of developing alternatives where levees can be immediately removed rather than having to be partially breached or removed over a period of several decades, thereby greatly increasing the pace restoration in the Project Area relative to deeply subsided areas.

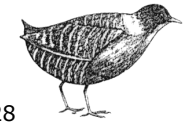
One of the largest issues raised during scoping concerned the scale and appropriateness of public access in the restoration project

The Park Service and CSLC conducted formal public scoping during the fall and winter of 2002-2003. A more detailed list of issues can be found in Chapter 5, but some of the primary issues raised during scoping by agencies and the public consisted of concerns about increases in flooding of adjacent properties and roads; increased saltwater intrusion into local municipal groundwater wells; impacts to the rural character of the local community; increased traffic, noise, and visitation within the local community; potential for incorporating Olema Marsh into the restoration project; and impacts to special status wildlife and plant species. One of the largest issues raised during scoping concerned the scale and appropriateness of public access in the restoration project. As a result, following scoping, the Park Service and CSLC elected to develop a specific public access-related project goal that focused on creating public access components within the Project that would allow the public to experience and enjoy the restoration process without compromising the Project purpose and restoration-related objectives. Another change that resulted from public scoping was inclusion of Olema Marsh, which was once integrated with the Giacomini Ranch into a large tidal marsh system, into the restoration project.

Scoping also formed the basis for identifying the primary constraints on restoration and public access that were discussed in Chapter 1, which are issues that needed to be factored into alternatives design. These primary constraints include not aggravating flood risk to adjacent private residences and public roads above current or existing conditions; not increasing salinity intrusion into municipal groundwater wells above currently existing levels; and minimizing or offsetting impacts to habitat for tidewater goby and California red-legged frog (*Rana aurora draytonii*) and other special status species with the understanding that the exact location of habitats such as fresh or brackish marsh may shift following implementation of restoration. Another constraint on restoration design is that current Seashore policy advocates not using chemicals to treat or remove invasive or non-native plant species during or after construction.

As noted above, reasonable alternatives are those that fall within or do not exceed boundaries of stated constraints, are economically and technically feasible, and display common sense. Although "display common sense" is not defined by the CEQ or Park Service NEPA regulations, it is generally accepted to mean alternatives that meet stated purpose or objectives and do not violate any regulations, laws, MOUs, or other legal agreements. For the proposed project, criteria that were considered and used to screen alternatives and restoration and public access elements during design were:

- Mitigation requirements stipulated in the agreement between CalTrans and the California Coastal Commission;
- Park Service's stated objectives at the time of the agreement;
- Mission and policies of the Park Service, including protection and restoration of watershed processes, wetlands, and floodplains; incorporation of public access into areas with sensitive natural resources; and incorporation of public access that is accessible to both able and disabled people.



- Purpose, Objectives, Planning Criteria, and Constraints of the proposed project;
- Federal, state, and local laws, regulations, and policies;
- Feasible from a technical perspective;
- Feasible from an economic perspective;
- Sustainable over the long-term such that alternatives incorporate actions that would not require extensive future maintenance or remediation.

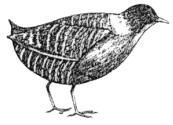
In 2003, a hydrologic consulting firm, Kamman Hydrology & Engineering (KHE; San Rafael, California) was hired to assist with alternatives development and to perform hydrodynamic modeling of preliminary and refined alternatives. Park Service and CSLC staff and the hydrologic consultants worked through a series of meetings and workshops to develop and evaluate various potential restoration and public access components. The topographic information and results of other baseline studies and scoping were used by the planning team to guide development of alternatives that would meet the purpose and objectives of the proposed project, as well as the other screening criteria such as mitigation requirements; laws, regulations, and policies; and project constraints.

When the Park Service and CSLC had developed a range of preliminary alternatives that met these criteria, they began a series of meetings in February 2004 with regulatory and local and state agencies, adjacent landowners, special interest groups, and technical wetland restoration experts to get feedback on the range and appropriateness of these preliminary alternatives. The culmination of this series of internal, agency, technical expert, and adjacent landowner meetings was a workshop for the public, held in June 2004.

In response to the considerable number of comments received on the public access portion of the proposed project, the Park Service and CSLC conducted a more detailed evaluation of public access. First, potential hydrologic, biological, and cultural resource impacts associated with multiple potential public access alignments and infrastructure locations were evaluated by KHE and LSA Associates (KHE et al. 2004). From analyses of resource impacts, the consultants narrowed the number of potential public access alignments and infrastructure locations that should be considered in the future to those 1) that would appear not to constrain or impinge upon the project purpose and objectives and 2) that would appear to have the lowest potential environmental impacts. Based on these recommendations, the Park Service and CSLC elected to carry forward only those public access alignments and locations rated as having low to moderate impacts on hydrologic, biological, and cultural resources for a second phase of study. The second study, prepared by LandPeople Landscape Architects (Benicia, Calif.), specifically focused on technical feasibility, land use impacts, and costs of selected public access alignments evaluated under Phase I (LandPeople 2005).

Following the workshops in 2004 and completion of the public access and further technical studies on Olema Marsh in 2005, the Park Service and CSLC worked with its consultants throughout the spring and summer of 2005 to refine preliminary restoration and public access components. In August 2005, the Park Service and CSLC held a Value Analysis process to ensure that it had developed a reasonable range of alternatives that met the screening criteria identified above and were cost-effective and to select a preliminary preferred alternative (Alternative C) for analysis in the DEIS/EIR. The Value Analysis team, which consisted of representatives from the Park Service, CSLC, and other partner agencies, maintained the existing range of alternatives, but suggested some modifications to increase potential benefits and cost-effectiveness. The Park Service presented the finalized alternatives and the Value Analysis team's recommendations to the Development Advisory Board in November 2005, which approved the Park Service's request to move forward with design.

The preferred alternative discussed in the DEIS/EIR is usually the one selected for implementation, unless new information, including information from public comments, becomes available that would suggest that implementation of another alternative would be preferable. As noted earlier, the Park Service and CSLC had initially selected Alternative C as the preferred alternative, although the environmentally preferred alternative was Alternative D. While the Value Analysis team felt initially that Alternative C offered the best combination of restoration and public access benefits, the planning team subsequently reevaluated this decision based on the comment received during release of the DEIS/EIR. Many public comments expressed support for maximizing the opportunity for restoration and minimizing public access elements that might detract from restoration such as the non-vehicular bridge. In addition, in making the decision to switch to Alternative D, the planning team recognized that, based on the amount and types of comments that it received from



individuals and agencies, public access components on the southern perimeter of the Project Area were perhaps "not ripe for decision" by NEPA standards. Proposed public access components that once received considerable support from the local community -- who would be both most affected by the facilities and most likely to use them -- received considerable opposition during the public comment period for the DEIS/EIR.

After reconsideration, the planning team has elected to follow the suggestions of many of the commenters to work cooperatively with the County of Marin in the future on options for connecting the Park Service trails on the northern bank of Lagunitas Creek with existing and potentially new facilities on the southern bank of Lagunitas Creek. This approach is now included in Alternative D and was already included to some degree in the DEIS/EIR in Alternatives A-C in the programmatic component that could potentially extend the southern perimeter trail to Inverness Park. Under Alternative D, the Park Service would commit to working with the County of Marin in the future on expansion of public access facilities on the southern perimeter of the Project Area, including potential creation of a trail on Levee Road and the Green Bridge, extension of a trail to Inverness Park, and/or construction of a non-vehicular bridge across Lagunitas Creek at the location of the old summer dam through a separate environmental compliance process.

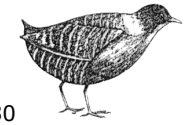
The preferred alternative is usually the one selected for implementation, unless new information, including information from public comments, suggests that implementation of another alternative would be preferable

Alternatives

As described, the Park Service and CSLC underwent an extensive and comprehensive alternative development process for both the restoration and public access components. As a part of this development process, at least eight full-scale alternatives and several minor to moderate variations to design of existing alternative restoration and public access components were considered. Of these eight alternatives, five are fully analyzed in this document. The other three were considered, but rejected because they would not adequately meet the project's purpose and objectives or were considered too similar in scope or duplicative to other existing alternatives. These alternatives and some of the more substantial variations to existing alternative design assessed are briefly discussed in the section, *Alternatives Considered But Not Analyzed Further,* at the end of this chapter.

With the exception of the No Action Alternative, the alternatives selected for analysis meet the Mission and policies of the Park Service and the purpose and objectives of the proposed project to an acceptably large degree and are within constraints imposed by regulations and policies, potential risks to adjacent homes and roads and the municipal water supply through increasing the extent of area open to tidal and fluvial (creek) flooding, and technical and funding limitations. Although alternatives in the FEIS/EIR must meet objectives and resolve planning issues to a large degree, they can vary in their methods, or in the degree to which each objective is met. This is the case with this project. For Alternatives A through D, alternatives generally range from the least amount of restoration to the greatest amount of restoration, with alternatives building upon each other such that restoration components or elements from Alternative A are generally (but not always) carried forward to Alternative B and are often expanded. For example, tidal creek creation and enhancement in Alternative A is carried forward to Alternative B, and the amount of tidal creek creation is expanded under Alternative B relative to Alternative A. As a result of comments received during initial scoping, the Park Service and CSLC decided to incorporate restoration of Olema Marsh, a diked freshwater marsh that was once part of a large historic tidal wetland complex that included Giacomini Ranch, into two project alternatives, Alternatives C and D.

The five proposed alternatives involve some combination of geomorphic and topographic alterations aimed at restoring natural hydrologic and ecological processes. These alterations would change the current hydrologic regime within the Project Area, leading either to muted tidal action, full tidal action, and/or natural creek



action (i.e., allowing creeks to meander naturally). Emphasis was placed on those alternatives that would create the most sustainable and dynamic ecosystems. Due to the comparatively high elevations in the Project Area relative to many other diked marshes, restoration of natural hydrologic and ecological processes would likely result in development of a complex mosaic of habitat types within the Project Area, including salt marsh, brackish marsh, freshwater marsh, riparian, and open water.

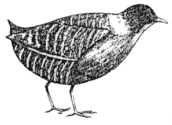
For the public access component, the extent of constructed infrastructure is highest under Alternatives A and B and decreases under Alternatives C and D, such that the least extent of constructed infrastructure occurs in Alternative D. This approach to public access is consistent with the project purpose and objectives, which states that public access opportunities should not conflict with the project's purpose of restoring natural hydrologic and ecological processes and functions. The highest degree of restoration of natural process and function occurs in Alternatives C and D, and this, combined with the fact that most of the Giacomini Ranch, including its perimeters are wetland and/or riparian areas, led to public access being scaled back to varying degrees under the Full and Extensive Restoration Alternatives (Alternatives C and D) relative to the Limited and Moderate Restoration Alternatives (Alternatives A and B).

The five proposed alternatives involve some combination of geomorphic and topographic alterations aimed at restoring natural hydrologic and ecological processes

Originally, the Park Service and CSLC intended to extend one of the proposed trails to Inverness Park on the west side of the Project Area. However, based on some of the logistical constraints identified in the public access studies and discussions with the county, the Park Service and CSLC have elected to focus on public access components on Park Service and CSLC lands in this project and potentially collaborate in the future with the County of Marin on a project that would extend the southern perimeter trail to Inverness Park, as originally envisioned. This decision to focus on public access components on Park Service-CSLC lands was predicated on two factors. First, most of the southern perimeter trail between White House Pool County Park and Inverness Park would or could occur on lands largely or entirely owned or managed by the County of Marin. This includes road right-of-ways, which are subject to County regulations and, therefore, would necessitate that the County either take the lead or actively partner on the public access project. Secondly, engineering analysis of the section of road near White House Pool showed that the creek is actively eroding towards Sir Francis Drake Boulevard, and repairs and revetment of the road should be completed before constructing facilities to accommodate public access (LandPeople Landscape Architects 2005). Because a portion of this extended trail could impact the restored Project Area either through removing riparian vegetation and expanding the Sir Francis Drake road berm or through construction of a boardwalk, the potential future impacts from these activities are addressed programmatically in this document, but would need to be addressed in greater depth in subsequent studies and documents.

For this DEIS/EIR, the No Action alternative represents conditions that would be expected to develop if only the minimum amount of restoration necessary to meet mitigation requirements was performed (3.6 acres) when the Giacomini Ranch dairy closes in 2007. It is important to note that continuation of the dairy is not included – and is not feasible – under any of the alternatives, including the No Action, because the sale essentially split the ranch and left a portion of the dairy facility in the Giacomini family ownership. However, under the No Action Alternative, some leased grazing could possibly occur, although pastures would not be irrigated.

One of the critical assumptions – and principal benefits – in developing alternatives that are based on restoring process and function is that it increases sustainability or resiliency of the proposed project by allowing for a considerable amount of change in future conditions without requiring maintenance, intervention, or remediation. By definition, natural processes are extremely dynamic ecosystem components that result in change either on seasonal, annual, decadal, or other long-term time scales. In transitional zones such as the upper portion of the Tomales Bay watershed, where freshwater and saltwater environments mix, the



dynamism can be even greater than in other aquatic ecosystems. Given this dynamism, the Park Service and CSLC recognized that its task was to remove impediments to natural process, not engage in an endless – and probably futile – battle to create and maintain ecological status quo through dictating the types of habitats, specific acreages and locations of habitats, and creek alignments. This approach increases the sustainability and resiliency of the proposed project not only to current ecosystem processes, but to factors that may affect it in the future such as sea level rise. While certain restoration tasks within alternatives may focus on creating creeks or realigning creeks into historic channels as a way of removing impediments to natural process, the Park Service and CSLC acknowledge that it is possible, because of the nature of natural fluvial or creek processes, particularly in deltaic systems, that the creek could change course or meander out of the constructed course in the future or fill in with sediment and cease to function as a channel. The Park Service and CSLC recognize this type of change or ecological evolution as inherent to the proposed project and not cause for maintenance or remedial action. In addition, should natural process result in change that affects public access infrastructure, the Park Service and CSLC would focus on adaptively managing public access to fit the changed environment rather than adapting the environment to fit public access. The only factors that would trigger future maintenance or intervention would be if 1) the project somehow did not successfully remove impediments to natural process or function or 2) if special status species habitat enhancement and creation efforts were not fully successful.

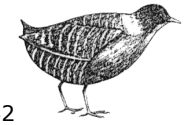
One of the principal benefits in developing alternatives that are based on restoring process and function is that it increases sustainability or resiliency of the proposed project

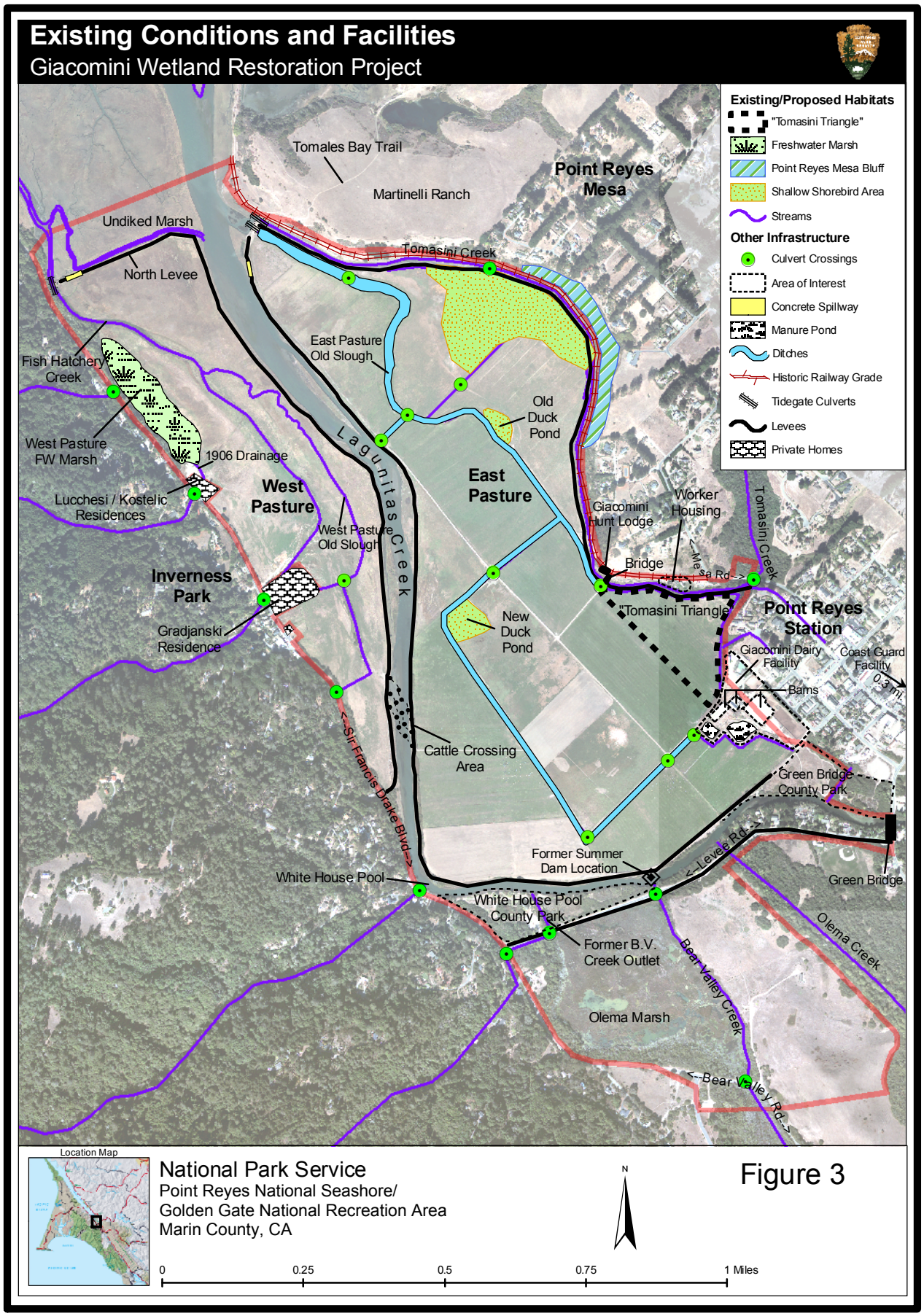
Detailed Project Area Description

The Project Area is located in coastal Marin County at the head of Tomales Bay between the towns of Point Reyes Station and Inverness Park (Figure 2). The Project Area lies at the confluence of Lagunitas, Olema, and Bear Valley Creeks with Tomales Bay. Lagunitas Creek flows in a northerly direction from the upper portions of its watershed in the Coast Range mountains through largely local- and state- owned lands to the headwaters of Tomales Bay where it curves to the west for a short distance before resuming its northward course. Lagunitas Creek bisects the Giacomini Ranch into two pastures – the East and West Pastures (Figure 3). Both of these pastures are leveed.

The 200-acre West Pasture is bordered by the town of Inverness Park and Sir Francis Drake Boulevard (Figure 3), which is the only road connecting the town of Inverness and the rest of the Point Reyes Peninsula to other areas within west Marin and the county. While most of the businesses and homes occur on the west side of Sir Francis Drake Boulevard at the base or along the steep hillsides of the Inverness Ridge, several private residences have been built on the east side of Sir Francis Drake Boulevard directly adjacent to the pastures. Several creeks and drainages, including Fish Hatchery Creek, drain off the Inverness Ridge and into the West Pasture, many of which flow through or close to private properties. Notable features within the West Pasture include the extensive freshwater marsh in the northern portion of the pasture, Fish Hatchery Creek, and the north levee, which is currently used as an informal social path.

The 350-acre East Pasture is bordered by the town of Point Reyes Station and the outlying residential community north of the town on the Point Reyes Mesa (Figure 3). The town is located on a mesa or coastal terrace, with all of the homes and businesses are elevated anywhere from 30- to 100 feet above the East Pasture. The lowest elevation portion of the mesa near the downtown portion of Point Reyes Station, which is almost triangular in shape, houses the Giacomini Dairy facility, including milking barns, loafing barns, hay barns, and corrals, as well as several small houses. The dairy runs parallel to C Street, located in the southwestern portion of the town. A number of homes, businesses, and agencies exist within the immediate vicinity of the dairy, including a Sheriff's substation and firehouse. The main commercial street in the town of Point Reyes Station is State Route 1, which is located two city blocks east of the dairy.




Existing Conditions and Facilities
Giacomini Wetland Restoration Project
Existing/Proposed Habitats
"Tomasini Triangle"
Freshwater Marsh
Point Reyes Mesa Bluff
Shallow Shorebird Area
Streams
Other Infrastructure
Culvert Crossings
Area of Interest
Concrete Spillway
Manure Pond
Ditches
Historic Railway Grade
Tidegate Culverts
Levees
Private Homes
Tomales Bay Trail
Martinelli Ranch
Point Reyes Mesa
Undiked Marsh
North Levee
Tomasini Creek
East Pasture Old Slough
Fish Hatchery Creek
West Pasture FW Marsh
1906 Drainage
Lucchesi / Kostelic Residences
West Pasture
West Pasture Old Slough
Lagunitas Creek
Old Duck Pond
East Pasture
Giacomini Hunt Lodge
Worker Housing
Mesa Rd
Bridge
Tomasini Creek
Tomasini Triangle
Point Reyes Station
Inverness Park
Gradjanski Residence
New Duck Pond
Giacomini Dairy Facility
Coast Guard Facility
0.3 mi
Barns
Sir Francis Drake Blvd
Cattle Crossing Area
Green Bridge County Park
Former Summer Dam Location
Levee Rd
White House Pool
White House Pool County Park
Green Bridge
Former B.V. Creek Outlet
Olema Creek
Bear Valley Creek
Olema Marsh
Bear Valley Rd
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 3

Below the Mesa is the remnant of the historic railroad grade which splits from Mesa Road near Tomasini Creek and hugs the base of the Mesa along most of the eastern perimeter of the East Pasture to Railroad Point. Railroad Point is a promontory located at the northernmost extent of the ranch (Figure 3). Several worker houses are adjacent to this historic railroad grade, as well as the Giacomini Hunt Lodge, a small building currently owned by the Park Service and leased long-term to the Giacomini family. Tomasini Creek, the primary drainage to the East Pasture, was leveed by the Giacominis in the 1960s to parallel the Mesa and historic railroad grade until its confluence with Lagunitas Creek and Tomales Bay near Railroad Point. Railroad Point is the terminus of GGNRA's Tomales Bay Trail that originates off State Route 1. This trail winds through GGNRA lands that are currently leased to the Martinelli family for beef cattle grazing (Figure 3).

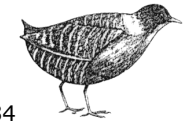
Residents of and visitors to Point Reyes Station often use an informal social path that has developed on the southern portion of the East Pasture levee and roughly ends near the location of the old summer dam (Figure 3). The Giacomini family used to install a gravel dam in this location on Lagunitas Creek every summer to obtain freshwater from the creek for use in irrigating the pastures to improve forage conditions. The Giacomini family was required to discontinue this practice in 1997 by the State Water Resources Control Board.

North of the Giacomini Ranch is undiked marshland owned by the CSLC (Figure 3). Several hundred acres of marsh formed between 1860 and 1950 extend outward into the southern portion of Tomales Bay before reaching largely unvegetated subtidal and intertidal lands. CSLC also owns the diked and undiked portions of Lagunitas Creek, as well as the area directly north of the Martinelli Ranch known as the Bivalve area. From Railroad Point, the historic railroad grade extends northeastward towards State Route 1, creating a diked area that is largely intertidal mudflat.

East Pasture – View from Lagunitas Creek

South of the Giacomini Ranch is the Levee Road area, a section of Sir Francis Drake Boulevard that was built through construction of a levee during the late 1800s (Figure 3). The northeastern half of Levee Road is residential, with more than 15 homes directly adjacent to Lagunitas Creek and across the creek from the East Pasture. The northwestern half of the southern bank of Lagunitas Creek is owned by the Wildlife Conservation Board (WCB) and leased and managed by the County of Marin Parks and Open Space District. This area is referred to in this document as the White House Pool County Park, because this is where Lagunitas Creek makes a 90 degree turn before resuming its northward course to Tomales Bay. The County also leases another WCB parcel directly south of the Giacomini Ranch Dairy facility downstream of the Green Bridge, which is referred to as the Green Bridge County park. The Green Bridge is a large, permanent steel, green-painted bridge on State Route 1 that crosses over Lagunitas Creek and connects the town of Point Reyes Station with the towns of Olema and Inverness Park. Directly upstream of the Green Bridge on the eastern bank of Lagunitas Creek is a commercial building and a propane storage tank. Further upstream is the Coast Guard facility where North Marin Water District (NMWD) has installed municipal groundwater wells. On the west bank upstream of the Green Bridge is the Genazzi Ranch.

The southwestern half of Levee Road borders Olema Marsh, a 63-acre marsh jointly owned by the Seashore and Audubon Canyon Ranch (Figure 3). Bear Valley Creek currently flows on the eastern perimeter of the marsh through culverts underneath Levee Road to its confluence with Lagunitas Creek near the location of the old summer dam. The marsh is bordered on the west and south by Bear Valley Road, which is also culverted to allow passage of flows from the upstream end of Bear Valley Creek into the marsh. One residence adjoins the marsh on its western side near the intersection of Bear Valley and Levee Roads. The eastern half of the marsh is bordered by the shutter ridge or a low earthen hill that has been created through episodic movement along the San Andreas Fault.



Existing or Baseline Conditions

NEPA and CEQA require that alternatives be evaluated with respect to baseline or existing conditions. The baseline can be, but is not necessarily, the same as the No Action alternative (Bass et al. 2001). The baseline is essentially a description of the affected environment at a fixed point in time, whereas the No Action alternative assumes that other things will happen to the affected environment even if the proposed action does not occur (Bass et al. 2001). The purpose of Chapter 3, Affected Environment, is to provide the public with a detailed description of baseline conditions. Often, baseline conditions in NEPA and CEQA are considered the conditions that existed at the time the NOI or NOP was issued (Bass et al. 2001).

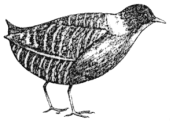
The baseline is essentially a description of the affected environment at a fixed point in time, whereas the No Action alternative assumes that other things will happen to the affected environment even if the proposed action does not occur

For the proposed project, baseline and No Action conditions are not the same, because the existing Reservation of Use agreement that was signed with the Giacomini family at the time the ranch was purchased includes discontinuation of the Giacomini Ranch dairy in March 2007. Because the structure of the purchase split future ownership of the dairy facility between the Park Service and the Giacomini family, continuation of any dairy operations would not be possible after March 2007, although there would be potential for leased grazing under a separate environmental review process. Baseline conditions, then, for the proposed project was assumed to be the conditions that have developed under -- and exist currently -- from long-term operation of a dairy. Baseline conditions were defined as those existing around the time that the Park Service issued a NOI to produce an environmental document in September 2002, and the CSLC issued a NOP, the CEQA equivalent of a NOI, in January 2003. Because many of the action alternatives involve changes to existing infrastructure or land management practices and are essential to understanding some of the proposed changes, these elements are described in Chapter 2, while a more detailed description of existing resource and socioeconomic conditions are provided in Chapter 3.

The Giacomini Ranch has supported a large-scale dairy cattle operation since 1946, when the Giacomini family diked a substantial portion of the historic tidal and subtidal wetland complex that once encompassed all of the ranch and Olema Marsh. Prior to the Giacominis, a smaller dairy reportedly operated on a portion of the site, but the Giacominis increased the scale of dairying operations substantially. Since the Park Service purchased the Giacomini Ranch in 2000, the Giacomini family has been operating under a Reservation-of-Use Agreement that enabled them to continue to manage 450 of the 550 acres transferred to NPS ownership until March 20, 2007. The remaining 100 acres, which are located in the northwestern portion of the West Pasture, are already under full Park Service ownership and management.

Cows and Dairy Facility

At least currently, the East Pasture has been much more actively managed through grazing, land leveling or grading, ditching, manure spreading, irrigation, mowing and other land management practices than the West Pasture. Many areas in the northern portion of the West Pasture have become ruderal through lack of active management. The Giacominis maintain both active (milking) and inactive (dry) dairy cattle herds in the East and West Pastures (see Figure 3). Typically, three herds are rotated through fenced portions of the East and West Pastures, with two herds in the East Pasture and one often in the West Pasture. The inactive cows are herded across Lagunitas Creek to the West Pasture. Twice a day, the active or milking herds in the East Pasture are moved into the



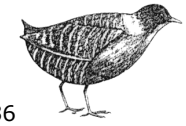
barns near C Street in the town of Point Reyes Station for milking. Olema Marsh, which is jointly owned by Audubon Canyon Ranch and the Park Service, is not actively managed, but appears to have been used for disposal of flood-related sediments during past decades.

As will be discussed in greater detail in Chapter 3, diking and other land management practices have not eliminated wetlands on the Giacomini Ranch or in Olema Marsh. The extent of wetlands may have been augmented in the East Pasture under existing conditions to some degree by extensive flood- and spray-irrigation of pastures during the summer to increase forage for cattle, although efforts were made during delineation of wetlands to determine which areas would be wetlands under natural conditions. Irrigation waters for the East Pasture come currently from waters pumped via pipeline from the NMWD's Downey Well. However, historically, the Giacomini family, which maintains a 2.0 cfs appropriative water right on Lagunitas Creek, installed a temporary gravel dam in the creek each summer across from the White House Pool County Park to create a large freshwater pool from which irrigation waters were drawn through pumping. The Giacomini family was forced to discontinue this practice in 1997 by the SWRCB. Irrigation and surface run-off waters are channeled through the East Pasture through a drainage ditch system that is actively maintained by the Giacomini family through dredging to remove sediments and aquatic vegetation that hinder movement of water. Dredged materials are sidecast to the side of the ditch, which were either actively dug or were former tidal sloughs that developed when the Project Area was not diked. In the past, waters from this ditch system were at least occasionally pumped into Lagunitas Creek. The West Pasture is not irrigated; however, the Giacomini family does have a 0.5 cfs water right on Fish Hatchery Creek that can be used for cattle watering and other purposes.

The Giacomini family performed regular maintenance on the extensive levee system for many decades, however, in recent years, levees are only repaired when severely damaged, and there is no routine maintenance. The levees, which are 4- to 6-feet higher than the adjacent pastures, reduce the amount of flooding from storm-related freshwater flooding and/or extreme tide events to large storm events occurring on average every three to 10 years. Floodwaters that do overtop the levees tend to flow northward due to sloped topography of the site and exit either through tidegates or concrete spillways installed in the northern edge of both the East and West Pastures. Flooding from Tomasini Creek has been minimized through construction of a levee during the 1960s that rerouted the creek to run along the eastern perimeter of the East Pasture along the Point Reyes Mesa bluff. The creek enters Tomales Bay at the very northern end of the East Pasture through a one-way tidegate/culvert flashboard dam system. This system is currently malfunctioning and allowing waters to flow in, as well as out. Off-site materials are typically imported to repair these levees when they are severely damaged: these materials are often sediments excavated from nearby creeks following large storms.

Another creek, Fish Hatchery Creek, flows through the West Pasture, but it has not been leveed, although it is occasionally dredged to remove sediments and improve drainage of the pasture. Similar to Tomasini Creek, the one-way tidegate system on Fish Hatchery Creek has failed at some point and is allowing some tidal flows into the West Pasture, which particularly the northern portion. In addition to these larger creeks, there are several smaller creeks and drainages in the West Pasture that have been culverted, straightened or ditched, and/or are actively dredged to maintain drier conditions. Lastly, several areas of the Giacomini Ranch perimeter have been ditched to contain groundwater or seep or spring flow originating from the Point Reyes Mesa and Inverness Ridge. At one point, the Giacominis maintained an access road on the historic railroad grade at the base of the Point Reyes Mesa on the eastern perimeter of the East Pasture. Maintenance of the culverts necessary to divert all the groundwater flow from this portion of the Mesa proved too difficult, however, and the Giacominis discontinued maintenance.

In addition to ditching and levee maintenance for both Lagunitas and Tomasini Creeks, topography of the Project Area has been altered and continues to be altered through land management practices such as grading and manure spreading. Most of these activities occur only in the East Pasture. Both the East and West Pasture are mowed once annually prior to flooding to produce additional forage for dairy cattle. At some point, the Giacominis may have actively sown seed for many of the herbs and grasses occurring in the pastures, many of which are considered pastoral species. Herbicides or pesticides may have been used as on other farms to control spread of unwanted plant or animal species. Primary efforts to control mosquito populations apparently involved intermittent introductions of non-native mosquitofish (*Gambusia affinis*) into the ditches and some of the creeks. Native aquatic floating emergents such as pennywort (*Hydrocotyle*) and mosquitofern (*Azolla*), which densely cover some portions of the ditches during the summer, appear to be managed through dredging rather than herbicides.



Ranch maintenance was typically conducted using earthmoving equipment. In addition, All-Terrain Vehicles (ATVs) were used to move herds from pasture to pasture and to the barns for milking. The dairy ranch received twice daily visits by milk trucks, as well as occasional delivery of supplies.

Most of the structures on the dairy ranch are located at the dairy facility and include an old calf barn, a milking barn and ranch office, a loafing barn, hay barn, and several homes. There are also several corrals and two manure ponds used for storing manure waste. The Giacomini family houses some of its dairy workers in homes located near Inverness Park and along the historic railroad grade near Mesa Road. It also has a 25-year Reservation of Use agreement on the Giacomini Hunt Lodge, an old house on the railroad grade adjacent to the East Pasture and northeast of the worker housing.

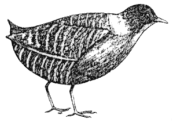
Other than dairying, the only activity that occurred in the pasturelands slated for restoration was hunting by the Giacominis and guests and informal public access along the southern and northern levees. Hunting ceased in 2003 following the death of Waldo Giacomini, but prior to his death, the Giacominis hunted for waterfowl during the fall. It is possible that hunting for deer also took place on the Giacomini Ranch.

While the Giacomini Ranch has not been public, informal public access spur trails have developed on the southern perimeter of the East Pasture levee and the northern perimeter of the West Pasture levee. Access to the existing informal path on the East Pasture levee is either from trails in the adjacent Green Bridge County park to the south or from 3rd and C Streets in the town of Point Reyes Station, where the Giacominis have maintained an entrance for dairy vehicle traffic. Most of the use of this trail is for walking or dog walking. Access to the informal path of the West Pasture's northern levee is from a pullout along Sir Francis Drake Boulevard in Inverness Park. This trail is principally used during the winter and spring months by birdwatchers interested in viewing California black rail (*Laterallus jamaicensis nevadensis*; ST) during extreme high tide events.

Since baseline conditions were established in 2001-2002, there have been other activities that have occurred, some of which have modified conditions within the Project Area. Following purchase of the Giacomini Ranch by the Park Service and continued management and operation of most of the pasturelands and the dairy by the Giacomini family under the Reservation of Use Agreement that expires in 2007, the Park Service has restricted most of its active management to emergency maintenance actions required for reducing flooding to adjacent private properties and for maintaining suitable diked conditions for grazing of the Giacomini cattle. In fall 2003, the Park Service performed an emergency replacement and repair of the tidegate and culvert for Fish Hatchery Creek, which had collapsed during the previous winter and appeared to be allowing much greater amounts of muted tidal inflow into the West Pasture. The Park Service replaced this tidegate with a modified structure designed to mimic the degree of muted tidal inflow that was already occurring prior to the culvert collapse. However, without any quantitative information on the degree of prior muted tidal inflow, exact replication of prior conditions was difficult, and it appears that the new tidegate is allowing slightly more tidal inflow into the West Pasture.

Cows and Point Reyes Mesa

In 2006, the Park Service conducted a habitat enhancement project in the 100 acres that it already owns and manages designed to increase habitat for two special status species that occur in the Giacomini Ranch. The existing freshwater marsh in the northern portion of the West Pasture that supports California red-legged frog was expanded by 0.27 acres to offset continuing loss of freshwater marsh habitat from encroachment of brackish marsh habitat due to increases in salinity intrusion into the marsh. Approximately 0.5 acre of alternate high tide refugia for wildlife was created in the northwestern end of the West Pasture, which will help to compensate for habitat that is currently trampled during the winter by cattle and visitors. Approximately 1,061 linear feet of temporary fence was constructed roughly halfway through the West Pasture to minimize disturbance to the constructed high tide refugia and expanded freshwater marsh in the northern portion of the West Pasture. This fencing would be removed once cattle grazing in the West Pasture ceased.



No Action Alternative, including Actions Common to All Alternatives

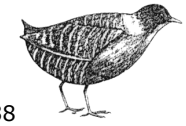
An alternative in which there is no project or "Action" is required under NEPA and CEQA and allows the public to determine what would happen relative to baseline conditions if there was no proposed project or change in management direction from that specified in current or existing management plans or agreements. Because the No Action Alternative does represent the continuation of current management programs or plans such as the General Management Plan (NPS 1980) and compliance with terms of existing agreements, it often does include several "actions" despite its name. There are several existing (as of the time the Notice of Intent was published in the Federal Register) agreements that the Park Service or other agencies would be subject to or obligated to comply with under all alternatives:

- ***Mitigation Agreement with CalTrans and the CCC***: The Park Service also entered into an approved agreement with CalTrans to provide mitigation for the Lone Tree Slide road repair in exchange for monies used for purchasing the Waldo Giacomini Ranch property and planning and implementation of a wetland restoration project. Under this agreement, as described in depth in Chapter 1, the Park Service is required to mitigate at least 3.6 acres of wetlands required to meet conditions specified by the California Coastal Commission (CCC) and CalTrans.
- ***Purchase and Reservation of Use Agreement with Giacomini Trust***: As part of the purchase agreement with the Giacomini Trust signed in 2000, the Park Service agreed to a 7-year Reservation of Use Agreement that allowed the Giacomini family to continue to operate the dairy and manage 450 acres of pastureland until March 2007, at which time the agreement expires, and the dairy is required to be closed. The Park Service would follow through on its stated intent at the time of the property purchase to re-designate the appropriative water right obtained as part of the purchase with the Giacomini Trust for beneficial in-stream uses.
- ***Water Supply Agreement with North Marin Water District***: Concurrently, NMWD also has an agreement with the Giacomini family for supplying irrigation waters pumped from the Downey Well upstream on Lagunitas Creek to the Giacomini Ranch. This agreement expires in July 2008.

An alternative in which there is no project or "Action" is required under NEPA and CEQA and allows the public to determine what would happen relative to baseline conditions if there was no proposed project or change in management direction

Continued compliance with various policies and management plans or actions already approved by the Park Service and the Seashore, including the Park Service Management Policies (NPS 2006), General Management Plan (Seashore 1980) and Exotic Plant Management Plan (Seashore 1989), are also considered part of the No Action alternative, as well as the other action alternatives. As part of this compliance, the Park Service would continue to perform certain maintenance activities such as removal of excess sediment from creeks that are required to ensure that flooding of adjacent private properties is not elevated above currently existing levels, as specified in Park Service Management Policies (2006) and Director Order's 77-2.

Described below are actions or conditions expected to occur that are either unique to the No Action Alternative or that would be undertaken under all alternatives (Figures 4 and 5, Table 1).



Restoration and Management Actions Common to All Alternatives

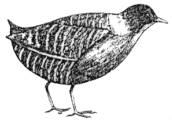
- ***No Agricultural Land Management***: Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, and fences.

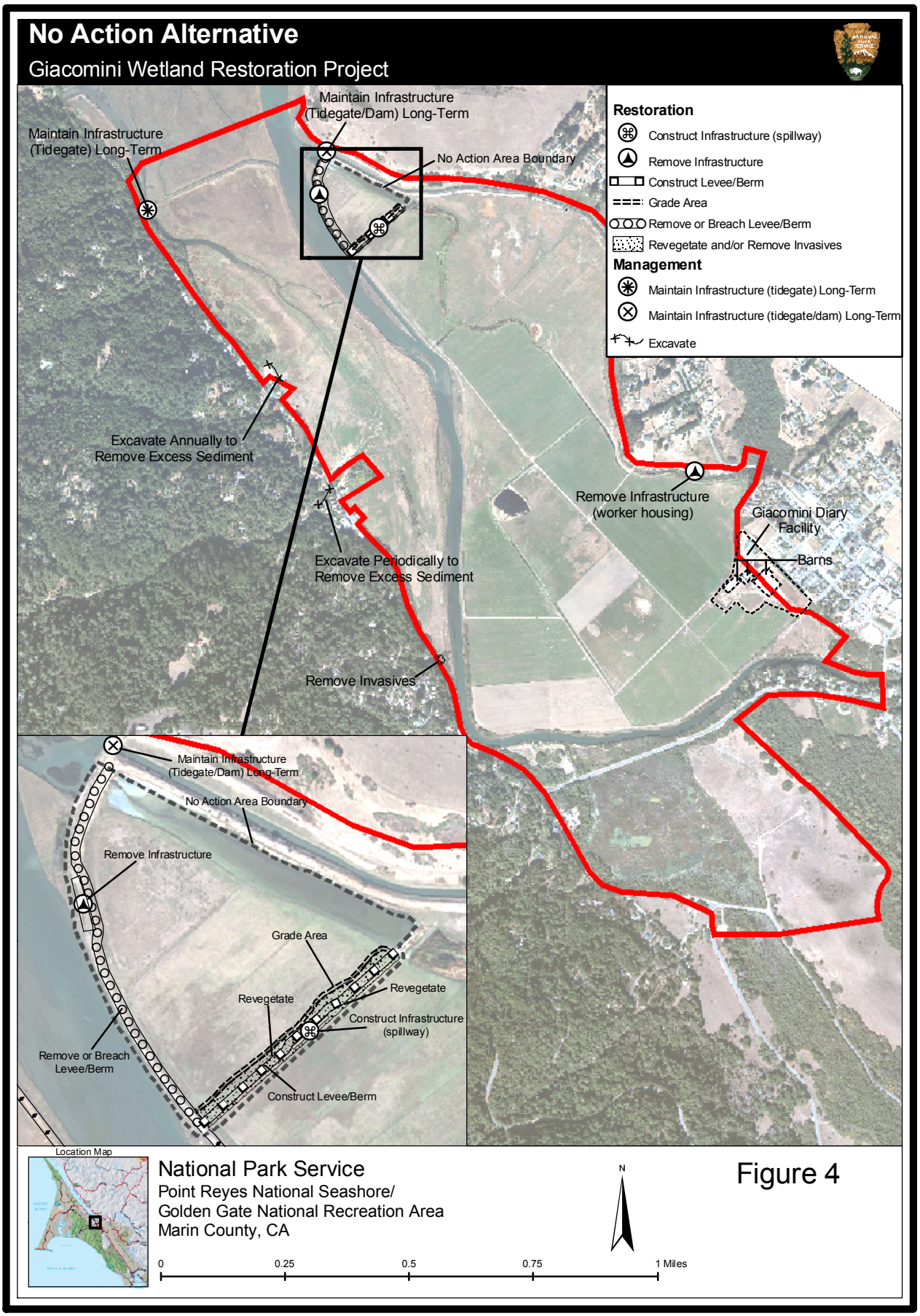
- ***Removal of Main Dairy Structures from Upland Areas***: Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the Park Service property will be removed from the premises. This removal would include all wiring and infrastructure on private lands east of the Giacomini Hunt Lodge. Standard erosion control practices will be implemented in these areas to stabilize the area. Removed materials would either be recycled to the greatest extent possible or transported to a municipal landfill such as Redwood Landfill in Petaluma, Calif.

- ***Removal of High Priority Invasive Species (Conduct Invasives Removal and Revegetation; Figure 4)***: Under the No Action and all four Action Alternatives, the Park Service would continue the Seashore's Exotic Plant Management Plan (1989) for prioritizing and eliminating invasive plant species. Some of the Category I or top priority species identified in this plan include pampas grass (*Cortaderia jubata*), English ivy (*Hedera helix*), periwinkle (*Vinca major*), and fennel *(Foeniculum vulgare*; Seashore 1989). Under the No Action, removal of high priority invasive species would be limited to that identified under the current Exotic Plant Management Plan (Seashore 1989) and would include 0.39 acres of cape ivy (*Delairea odorata*) and less than 0.007 acres of pampas grass. Cape ivy patches occur exclusively in the riparian habitat on the western perimeter of the West Pasture adjacent to Sir Francis Drake Boulevard. Pampas grass occurs in one occurrence in the riparian habitat along Sir Francis Drake Boulevard and one occurrence on the Tomasini Creek levee in the East Pasture. The Park Service treats cape ivy using a non-chemical approach by manually limbing infested trees and removing all ground cover species. Maintenance involves follow-up monitoring and treatment, if necessary, to ensure that the species does not reestablish.

- ***Recover the Tomales Bay Tidewater Goby Population***: One of the surviving, federally endangered tidewater goby populations inhabits Tomasini Creek with occasional occurrences in adjoining areas. This population is genetically distinct from other goby populations (Jacobs 2004); its genetics reflect its long isolation and recent bottleneck conditions. Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in the vicinity of the Project Area. Final actions will be determined through formal consultation with the USFWS. They will likely include the following: 1) identification of sites with suitable habitat for tidewater gobies in the Tomales Bay watershed, and 2) evaluation and implementation of either direct introduction of fish collected from Tomasini Creek and other areas within the Project Area or introduction in conjunction with artificial propagation of collected fish. Finally, should an artificial propagation program be initiated, the Park would work with a public aquaria to combine propagation efforts with a public education program to increase awareness of endangered species and estuarine wetland restoration.

- ***Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses***: The Giacomini family maintains a 2.0 cfs senior appropriative water right on Lagunitas Creek. As part of the purchase of the Giacomini Ranch, the Park Service received this appropriative water right. Historically, the Giacominis installed a temporary gravel dam during the summer to create a freshwater pond from which irrigation waters were pumped, however, the SWRCB ordered the Giacomini family to discontinue installation of the dam in 1997. Since 1997, the Giacomini family has received irrigation waters from the NMWD Downey Well upstream on Lagunitas Creek. This water is pumped via a pipeline to the Giacomini Ranch and then routed through the East Pasture in drainage ditches. Following expiration of the Reservation of Use agreement and closure of the dairy ranch, no irrigation activities will be warranted, and the Park Service proposes to convert its appropriative water right from agricultural to instream uses for the benefit of wetlands habitat, fish and wildlife resources,




No Action Alternative
Giacomini Wetland Restoration Project
Restoration
Construct Infrastructure (spillway)
Remove Infrastructure
Construct Levee/Berm
Grade Area
Remove or Breach Levee/Berm
Revegetate and/or Remove Invasives
Management
Maintain Infrastructure (tidegate) Long-Term
Maintain Infrastructure (tidegate/dam) Long-Term
Excavate
Maintain Infrastructure (Tidegate/Dam) Long-Term
Maintain Infrastructure (Tidegate) Long-Term
No Action Area Boundary
Excavate Annually to Remove Excess Sediment
Excavate Periodically to Remove Excess Sediment
Remove Invasives
Remove Infrastructure (worker housing)
Giacomini Diary Facility
Barns
Maintain Infrastructure (Tidegate/Dam) Long-Term
No Action Area Boundary
Remove Infrastructure
Grade Area
Revegetate
Revegetate
Construct Infrastructure (spillway)
Remove or Breach Levee/Berm
Construct Levee/Berm
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 4

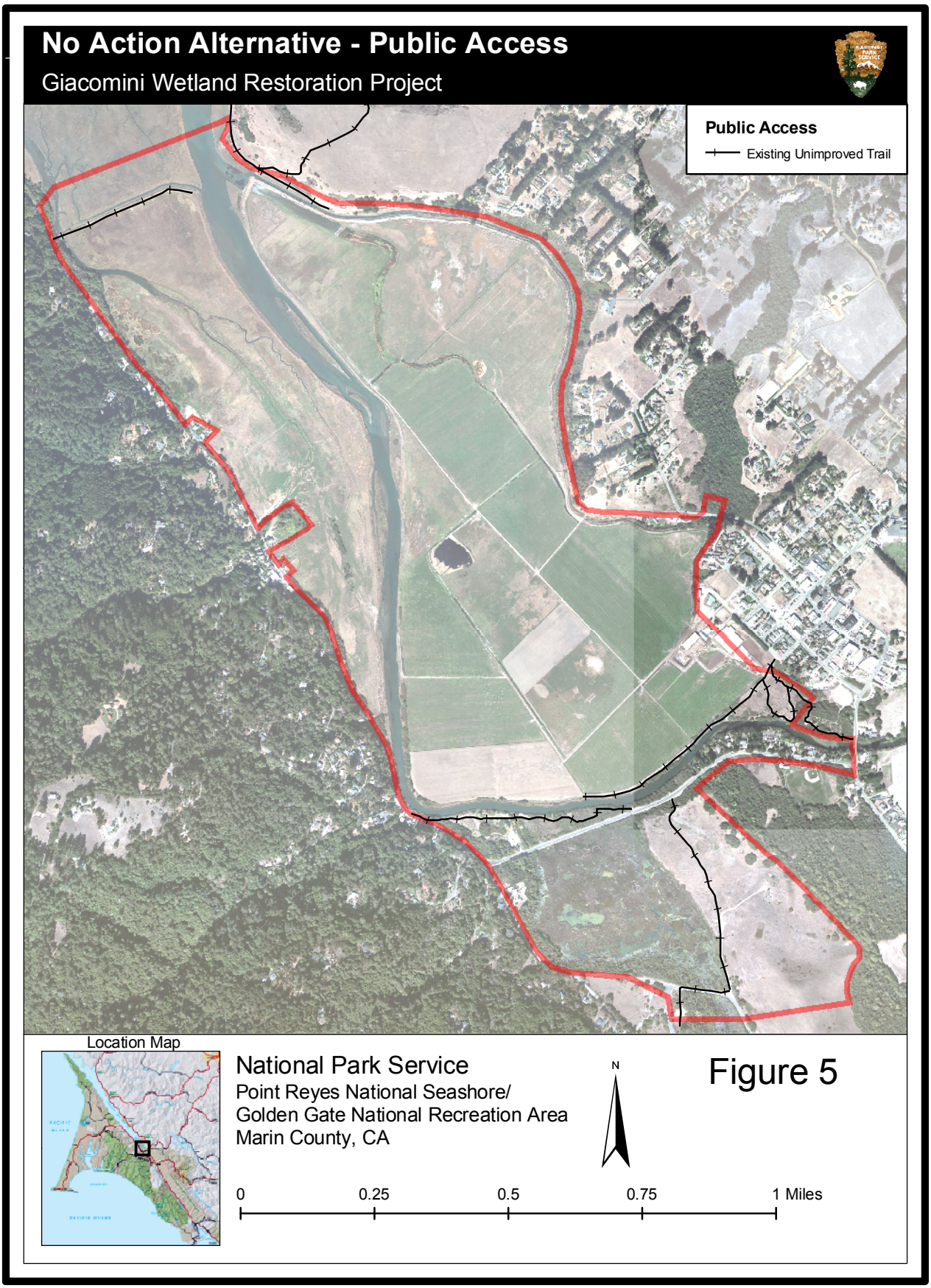

No Action Alternative - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
Figure 5
0
0.25
0.5
0.75
1 Miles

TABLE 1: SIZE OR EXTENT OF ALTERATIONS PROPOSED TO ECOSYSTEM STRUCTURE AND FUNCTIONING AND PUBLIC ACCESS FACILITIES UNDER THE GIACOMINI WETLAND RESTORATION PROJECT.

Some areas are affected by more than one action. NA refers to No Action; OM/WHP refers to Olema Marsh and White House Pool.

		NA	Alternative A				Alternative B				Alternative C				Alternative D			
			East	West	OM/ WHP	Total	East	West	OM/ WHP	Total	East	West	OM/ WHP	Total	East	West	OM/ WHP	Total
Length of Levee Breached or Removed	Feet	660	2700	0	0	**2700**	9600	2400	0	**12000**	9660	7200	0	**16860**	9600	7200	0	**16800**
Lowering of Levee or Berm	Feet	0	0	0	0	**0**	1680	0	0	**1680**	80	0	0	**80**				
Length of Channels Hydraulically Reconnected	Feet	1016	2998	0	0	**2998**	2998	0	0	**2998**	2998	0	0	**2998**	2998	0	0	**2998**
Length ofChannels with Improved Connectivity	Feet	0	0	0	0	**0**	0	7505	0	**7505**	1304	7505	1960	**10769**	>1304[3]	7505	1960	**9465**
Length of Tidal Channels Created	Feet	0	624	0	0	**624**	2824	500	0	**3324**	4794	500	0	**5294**	5344	500	0	**5844**
Length of Realigned Channels	Feet	0	0	0	0	**0**	1500	0	0	**1500**	5620	0	0	**5620**	6924	0	0	**6924**
Length of Regraded Creek Bank	Feet	0	1400	0	0	**1400**	1969	0	0	**1969**	1969	0	0	**1969**	1969	0	0	**1969**
Freshwater Marsh Created or Enhanced	Acres	0	0	0	0	**0**	5.4	0	0	**5.4**	5.4	0	2	**7.4**	5.2	0	2	**7.2**
High Tide Refugia Created	Acres	0.44	0	0	0	**0**	1.7	0.07	0	**1.77**	1.7	0.07	0	**1.77**	1.6	0.07	0	**1.67**
Manured Area Excavated and Removed	Acres	0	13	0	0	**13**	13	0	0	**13**	13	0	0	**13**	13	0	0	**13**
Weedy Areas Scraped to Remove Non-Natives	Acres	0	0	0	0	**0**	0	0	0	**0**	40	0	0	**40**	26.1	0	0	**26.1**
Areas Excavated to Lower Elevations	Acres	0	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	32.5	0	0	**32.5**
Active Revegetation Area	Acres	0	17.6	0	0	**17.6**	28.7	0.2	0	**28.9**	68.7	0.9	0	**69.6**	64.2	0.9	0	**65.1**
Non-Native Invasive Removal Areas	Acres	0.4	4.6	0.4	0	**5.0**	8.9	0.44	0	**9.3**	10.5	0.44	0	**10.9**	12.1	0.44	0	**12.54**
Length of Trail or Paths Created	Feet	0	7125	0[1]	0	**7125**	7125	0[1]	0	**7125**	3725	0[1]	0	**3725**	2625	0[1]	0	**2625**
Length of Trail or Paths Improved or Enhanced	Feet	0	1672	0	0	**1672**	1672	0	0	**1672**	2953	0	0	**2953**	2953	0	200	**3153**
Length of Trail Maintained in Existing Condition	Feet	8950	1281	1475	4522	**7278**	1281	0	4522	**5803**	0	0	4522	**4522**	0	0	4322	**4322**
Length of Trail Eliminated	Feet	0	0	0	0	**0**	0	1475	0	**1475**	0	1475	0	**1475**	0	1475	0	**1475**
No. of Viewing Areas and Overlooks Created	No.	0	3	0	0	**3**	3	1	0	**4**	3	1	0	**4**	2	1	1	**4**
Total Size of Area to be Restored	Acres	***11***				***350***				***550***				***613***				***>613*** [2]
Total Length of Trail	Feet	***8950***				***16075***				***14600***				***11200***				***10100***

[1] Potential for boardwalk trail as part of future project

[2] This refers to trail in Green Bridge County park that is leased and maintained by the County and would link to Park Service trail.

[3] Potential for improvement in hydraulic connectivity extends upstream of Mesa Road due to culvert replacement

and recreation. This was approved by the SWRCB in 1992 as a valid purpose of water right use under State Water Code Section 1707.

- ***Lease Subtidal and Intertidal Portions of Lagunitas Creek within Project Area from CSLC***: The Park Service would lease subtidal and intertidal portions of Lagunitas Creek within the Project Area from the CSLC, which currently owns these lands, as well as subtidal and intertidal lands north of the Giacomini Ranch. The northern boundary of the lease would be the Giacomini Ranch north levee and the northern extent of Park Service ownership. The southern boundary would be just north of the Green Bridge.

- ***Minimal Maintenance and Maintenance of Existing Property Access Points***: Park Service personnel would need to perform maintenance in certain areas either on a regular or occasional basis and would continue to use existing access points where feasible such as 3rd and C Street and Mesa Road entrances in Point Reyes Station and existing access points for West Pasture in Inverness Park.

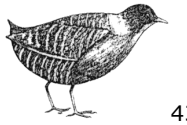
- ***Maintenance Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 4)***: During the Giacomini ownership and management of the West Pasture, the Giacominis have worked with residents living adjacent to the Inverness Ridge creeks such as the 1906 Drainage and Fish Hatchery Creek to remove excess sediments so that creek flows do not back up onto the properties and cause flooding of the homes. The 1906 Drainage flows off the Inverness Ridge into the West Pasture, ending at the southern end of the Freshwater Marsh, and often carries high sediment loads due to the unstable nature of geologic conditions in the upper part of this small watershed. Fish Hatchery Creek flows off the Inverness Ridge into the West Pasture further south on the north side of another residence. Under the No Action and all Action Alternatives, the Park Service proposes to continue to perform maintenance of the downstream portion of these creeks on an annual or periodic basis ***as needed*** to ensure that it does not elevate flood risk to adjacent properties above currently existing levels, as specified in current Park Service Management Policies (2006) and Director's Order 77-2. Approximately 200 cubic yards of sediment is typically excavated on an annual basis during average to wet years, but it is possible that, during very wet years, it would need to be excavated more than once annually to ensure that properties are not flooded. Maintenance may be less frequent than annually during dry years.

- ***Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek***: Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacominis will have up to 90 days to remove personal property from the premises. Part of the Giacominis' personal property includes trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.

Mitigation/Restoration and Management Actions Unique to the No Action Alternative

- ***Mitigation Requirements Completed Through Wetland Restoration in the East Pasture (Breach or Remove Levee, Remove Infrastructure, Construct Levee, Construct Infrastructure, Conduct Revegetation; Figure 4)***: Approximately 11 acres of wetland restoration would be performed in the northwestern corner of the East Pasture. This would ensure that the Park Service met the requirement specified in its agreement with CalTrans and the California Coastal Commission of at least 3.6 acres of wetland restoration. The additional 7.4 acres of wetlands is included to ensure that the Park Service meets its mitigation obligation and does not need to perform remedial measures in the future. It also lessens the amount of new levee or infrastructure that would be needed to connect with an existing levee or berm (Figure 4).

  The culverts and levee that block connection of the Old Slough Pond with Lagunitas Creek and the southern end of Tomales Bay would be removed, as well as a large section on the northern and southern sides of the concrete spillway. Levee removal would total approximately 700 lineal feet. Approximately 600 feet of new levee would be constructed at approximately the southernmost extent of the historic slough ponded area, creating approximately 11 acres of undiked wetland and waters that would be open to tidal flooding and flooding from Lagunitas Creek. The concrete spillway that



allows floodwaters to drain out of the East Pasture into Lagunitas Creek would be removed, and a new 140x9-foot concrete spillway would be constructed as part of the new levee. Plant establishment on the new marsh floodplain would be expected to occur naturally due to the favorable intertidal elevations and proximity of the Project Area to a seed source – the undiked marsh north of the Giacomini Ranch owned by the CSLC.

The base of the new levee would be tapered to create a high marsh transition zone ranging from 6-8 feet NAVD88 between the restored wetland (~ 4 feet NAVD88) and the new levee (8-10 feet NAVD88), which would function as an upland ecotone. The high marsh transition zone and upland ecotone levee would be revegetated to improve the potential for successful establishment of native vegetation communities and reduce the amount of non-native species establishment. In salt marsh areas, higher elevation and upland ecotone zones are more likely to become dominated by non-native or invasive plant species due to the reduced salinity and better aeration of soils. Irrigation may be used during the first two summers to enhance survival of plantings.

Undiked Salt Marsh

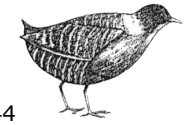
- ***No Dairy Operation or Agricultural Land Management, But Potential for Leased Grazing Contingent upon Public Review***: As described earlier, dairy operations will cease when the Reservation of Use Agreement expires on March 20, 2007, and the Park Service will assume full management of the 550 acres that it purchased in 2000. Under the No Action Alternative, there is no potential for continuation of a dairy operation due to splitting of the dairy facility ownership. However, there would be the potential to continue grazing of dairy cattle heifers or beef cattle contingent under a lease agreement upon a separate public review process, as no wetland restoration beyond the 11 acres described above would occur. Under any lease agreement, grazing would potentially be subject to stocking density and seasonal or area use restrictions designed to minimize impacts from cattle upon wetlands and riparian zones.

  In addition to changes in grazing, current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc.

- ***Tidegates and Levees Retained, But Generally Not Maintained (Figure 4)***: Under the No Action Alternative, approximately 16,650 lineal feet of levees on the East and West Pasture would be retained, but levees would generally not be actively maintained. Currently, levees are only repaired when a failure or breach appears imminent. In addition, maintenance and cyclic replacement of the culverts, tidegates, and other hydrologic control infrastructure would not continue, except on Tomasini Creek. Maintenance of the Tomasini Creek tidegate and flashboard dam structure would continue under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture

Public Access Unique to the No Action Alternative

- ***Existing Public Access Maintained along Informal Paths (Maintain Existing Unimproved Trail; Figure 5)***: Public access would continue to be informal under the No Action Alternative along existing informal dirt paths on the north levee of the West Pasture (approximately 1,475 lineal feet) and the southeastern portion of the East Pasture (approximately 1,625 lineal feet). Other more formalized trails in the Project Area would also continue to exist, including the Olema Marsh trail (approximately 2,050 lineal feet), the White House Pool County park trail (approximately 2,472 lineal feet), and the Green Bridge County park trail (more than 1,300 lineal feet). There would be no linkage between east and west sides of Lagunitas Creek or between Tomales Bay Trail and Mesa Road in Point Reyes Station or established viewing areas, overlooks, or interpretative exhibits.



- ***ADA-Compliant Access***: There would be no ADA-compliant component, as it does not currently exist.

Construction

- ***Construction Scheduling***: Construction for the restoration required for mitigation under the agreement with CalTrans would be conducted from August through October during one (1) construction year. Construction would not start until after August to preclude impacts to special status rail species in the undiked marsh north of Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1, and there are regulations regarding timing of construction or proximity of construction to active nests during the breeding season for other birds, as well. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under special circumstances authorized by the Seashore and CSLC.

- ***General Description of Construction-Equipment and Water Control Measures:*** Construction equipment that would be expected to be used in construction includes, but is not limited to, excavators, front loaders, bulldozers, graders, dump trucks, and water trucks: some of this equipment may need to be specialized for use in muddy or aquatic areas due to the shallow groundwater table. The water truck would be used for dust control in the Project Area. Ancillary equipment that may be used include a diesel generator, water pump, and a piledriver.

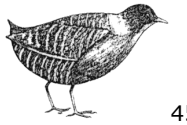
  During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough. These temporary actions would conform with Best Management Practice (BMPs) protocols outlined at the end of this chapter for minimizing impacts to water quality and aquatic species.

- ***General Description of Construction, including Staging, Stockpiling, and Access***: Under the No Action Alternative, construction activities would be limited to the very northwestern end of the East Pasture (Figure 4). Construction equipment would most likely access the East Pasture from the ranch road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station. Equipment would most likely be staged near the Giacomini Hunt Lodge and in the East Pasture.

  Any stockpiling of excavated sediments would occur in the East Pasture. Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local connector roadways and state highways such as Mesa Road, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road (see further description under Total On-Site and Off-Site Disposal below). Occasional delivery of supplies and materials would be necessary, such as for erosion control materials, water diversion, and fuel. It is assumed that a water truck would refill three to five times per day, necessitating a drive offsite. Traffic control measures are not anticipated to be necessary under this alternative. Construction would not affect access to informal public access paths that currently exist in the Project Area.

- ***Total Cut/Fill***: Although additional cut and fill would take place if any of the action alternatives were selected, all alternatives, including No Action, which includes actions already approved under existing management plans and agreements, would result in a certain minimum amount of cut and fill. Actions that are part of the existing mitigation agreement with CalTrans would result in excavation of approximately 3,800 cubic yards of soil and 120 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 2,900 cubic yards of soil (Figure 9). Excavation would result from removal of the levees, while construction of a new levee and creation of high marsh habitat at the southern end of the hydrologically reconnected wetlands would account for all of the fill activities. Building removal would generate additional non-soil materials.

- ***Total On-Site and Off-Site Disposal***: On-Site Disposal and Off-Site Disposal related to cut and fill for the No Action Alternative total approximately 2,900 and 880 cubic yards of soil, respectively (Figure 6). In addition, non-soil materials totaling 120 cubic yards would also need to be disposed of off-site. As noted above, building removal would generate additional non-soil materials. There is a possibility that some or all the non-soil materials could be recycled; non-soil materials that cannot be recycled would be disposed of at a municipal landfill.



Soils removed off-site would be hauled from the East Pasture to an abandoned quarry in the Tomales Point portion of the Seashore. Most of the excavated sediment would be disposed at the McClure DG, Grossi, Evans, Evans-Abbott, and McClure Flat quarries (Figure 7). These soils would be hauled to the quarries using local connector roadways and state highways such as Mesa Road, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, cross a pasture to reach quarries. Most of these materials hauled off-site would be weedy materials that would be buried at the bottom of the quarries and overlain with clean fill materials to minimize potential environmental impacts. A separate quarry close-out plan has been developed to ensure structure integrity of fill to the quarries and minimization of weeds from the Project Area being spread elsewhere. Compliance on the quarry close-out plans is being conducted separately, and completion is not required to be completed before disposal takes place. Non-soil materials would be disposed of at a municipal landfill approximately 40 miles away in Petaluma, California.

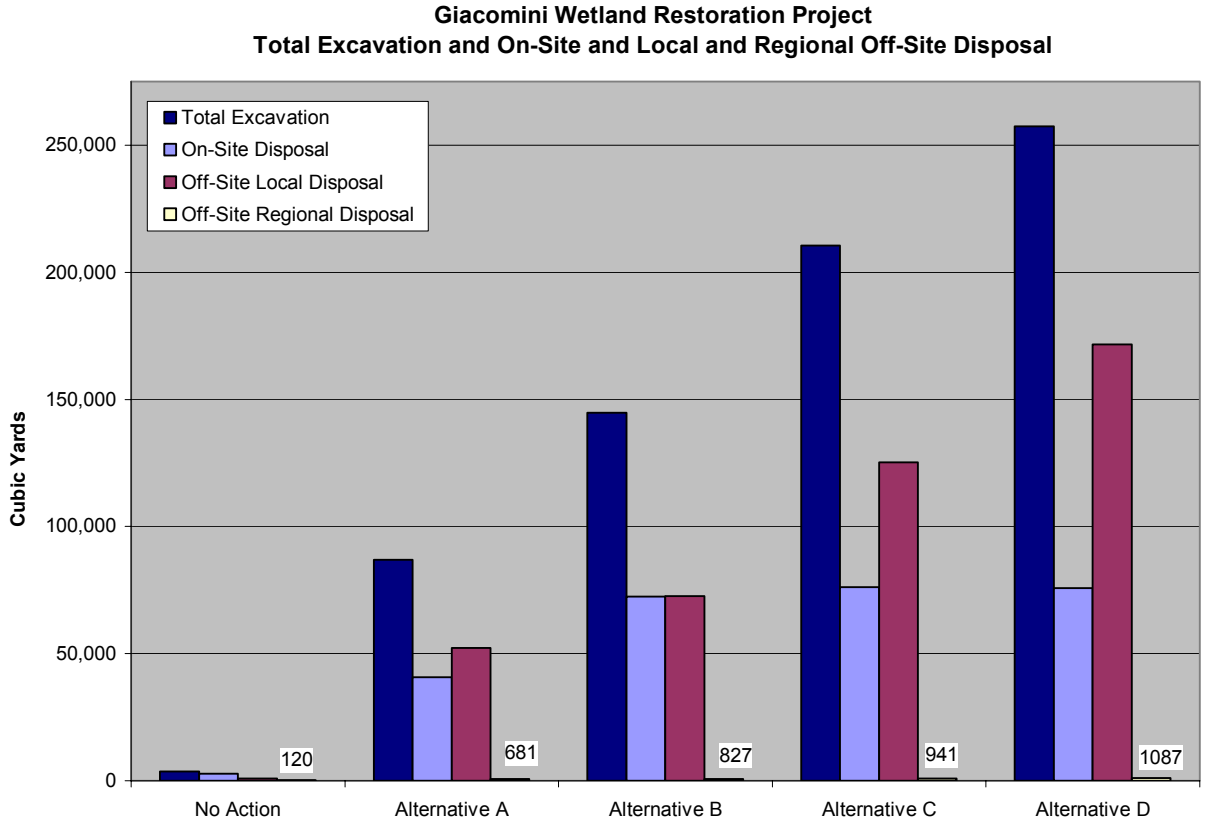
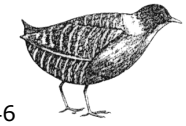
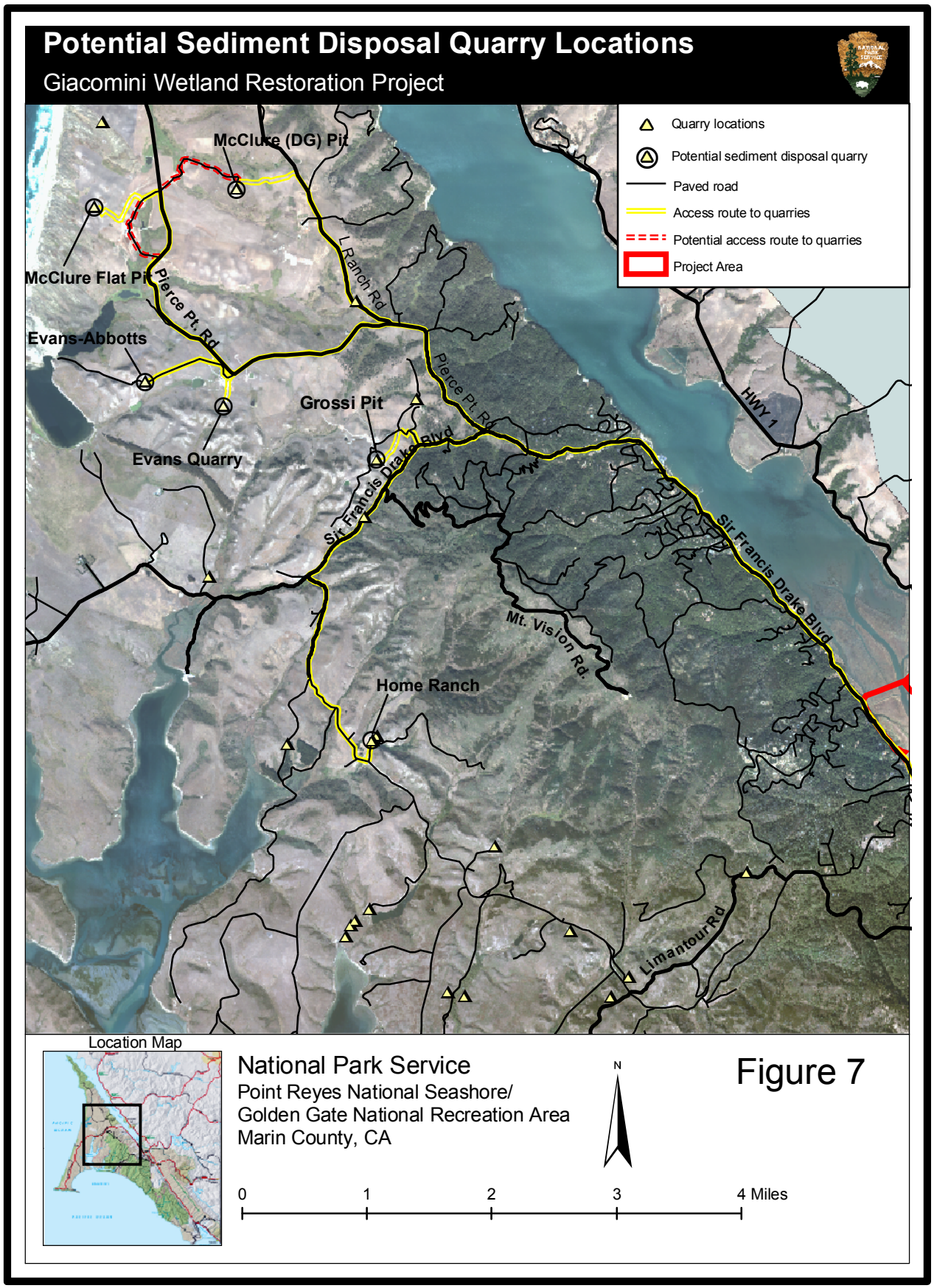


FIGURE 6. TOTAL EXCAVATION AND ON-SITE AND LOCAL AND REGIONAL OFF-SITE DISPOSAL

Alternative A – Limited Restoration of the Giacomini Ranch East Pasture Only with Expanded Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter, Including Actions Common to All Action Alternatives

As described earlier, restoration actions conducted in Action Alternatives build upon each other such that, to a large extent, the restoration actions in one alternative are carried forward into the next. Alternative A would involve selective breaching of the East Pasture levee, while levees and tidegates in the West Pasture would not be removed. A limited amount of tidal channel creation, creek bank grading, and revegetation would be performed in the East Pasture, as well (Figure 8, Table 1). Restoration actions in Alternative A encompass




Potential Sediment Disposal Quarry Locations
Giacomini Wetland Restoration Project
Quarry locations
Potential sediment disposal quarry
Paved road
Access route to quarries
Potential access route to quarries
Project Area
McClure (DG) Pit
McClure Flat Pit
Pierce Pt. Rd
L Ranch Rd
Evans-Abbotts
Evans Quarry
Grossi Pit
Pierce Pt. Rd
Sir Francis Drake Blvd
HWY 1
Sir Francis Drake Blvd
Mt. Vision Rd.
Home Ranch
Limantour Rd
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
1
2
3
4 Miles
Figure 7

actions common to all Action Alternatives and are carried forward into Alternatives B-D. These common actions are described here in detail and are only noted in descriptions of Alternatives B through D, unless there are changes or additions. A similar description approach is used for public access components, although all of the public access components in Alternative A are not carried forward into Alternatives B-D (Table 1).

Restoration

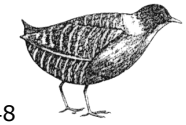
East Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure; Figure 8)****:* Agricultural infrastructure present in the East Pasture and in certain other areas of Park Service lands would be removed. Roads would be shallowly graded or ripped to remove compaction, and soils generated would be used to fill in drainage ditches. To ensure that drainage ditches do not continue to channel drainage flows in the East Pasture, dense clay materials excavated during enhancement or creation of tidal creeks (see below) would be placed strategically in drainage ditches as "blocks" to retard lateral flow. Culverts that currently channel irrigation and surface runoff waters through the drainage ditches would be removed and recycled or disposed of at a municipal landfill. Other infrastructure such as concrete spillways, bridges, electrical lines, transmission poles, pipes, pumphouses, and fencing would also be dismantled and disposed of at the Redwood Landfill (Petaluma, California). The Old Calf Barn, which is located at the top of the mesa at the dairy facility, would also be torn down, and the materials would be disposed of at the Redwood Landfill. The septic system underneath the Worker Housing along Tomasini Creek would be removed and disposed of at the Redwood Landfill. Removal of infrastructure would generate approximately 700 cubic yards of non-soil material.

  Under all the Action Alternatives, the tidegate and flashboard dam structure at Tomasini Creek would be retained, but not actively maintained, for a period of 10- to 20 years to maintain existing habitat for the federally endangered fish species, the tidewater goby. Prior to its discovery in Tomasini Creek during baseline studies for the proposed project, tidewater goby had not been sighted in the watershed since 1953. The Tomasini Creek population was the only known occurrence of this species in Tomales Bay until 2005, when it was also found in the West Pasture Old Slough. The existing tidegate-dam structure allows the full upper range of high tides, but minimizes drainage during low tides. By retaining this structure, the Park Service and CSLC believe that they can maintain existing habitat during the early restoration process, while additional habitat begins to develop in other portions of the Project Area.

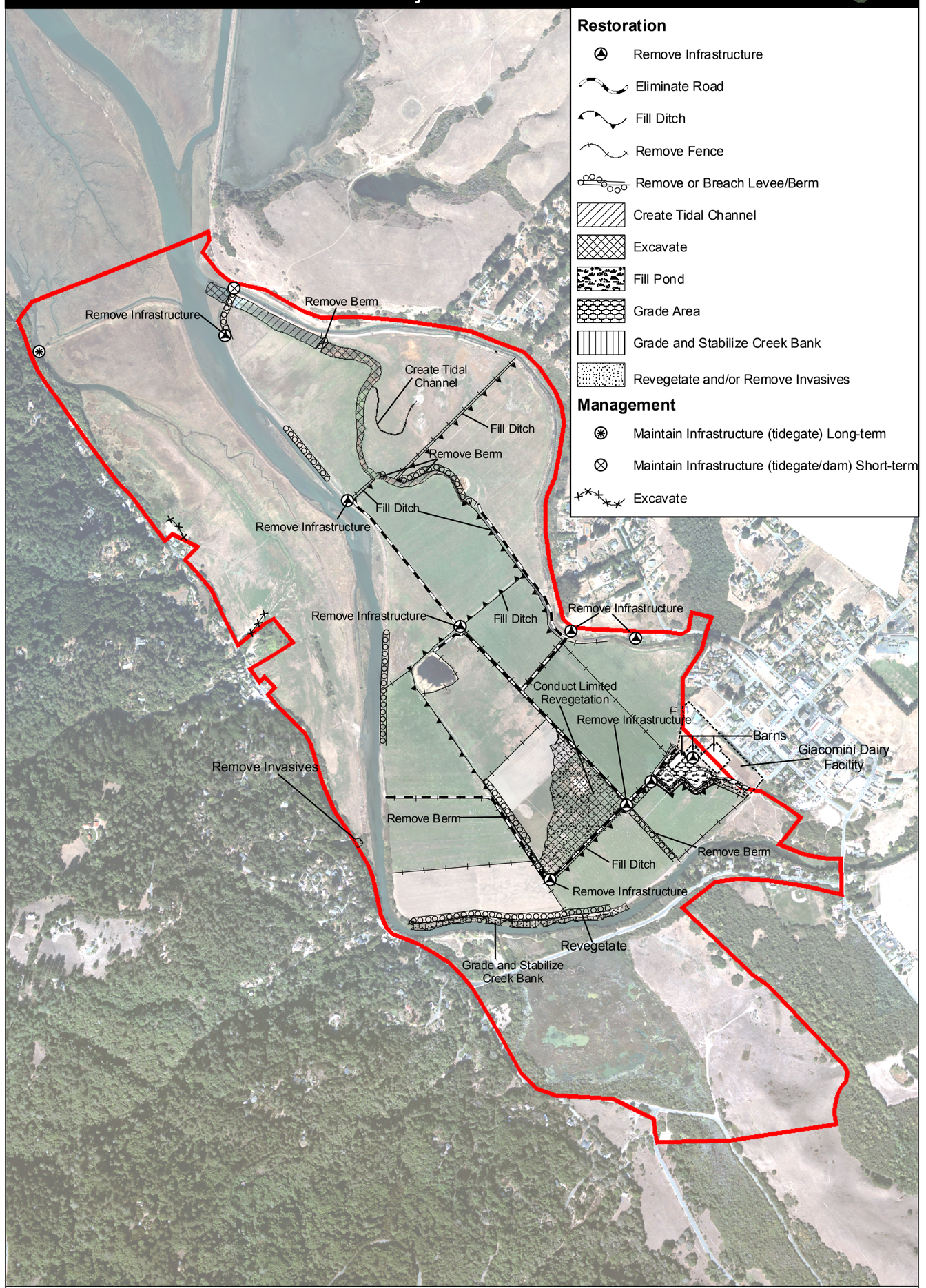
- ***Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation; Figure 6)***: The Giacominis have disposed of manure from dairy cattle operations using a combination of temporary storage in two manure disposal ponds at the dairy facility with permanent disposal in selected manure disposal pastures that have been subjected to heavy applications of manure. Because of repeated applications of manure, these areas, which total approximately 13 acres, appear to be above the grade of the surrounding pastures. To some degree, manure has been and is spread in other pastures, as well, but, based on staff observations and testing of soils (Park Service, unpub. data), loading rates in these pastures appear to be much lower. In higher elevation portions of the manure disposal pastures (>6 feet NAVD88), approximately 1- to 2.5 feet of soil would be excavated and hauled less 0.25 miles to the Manure Disposal Ponds. Excavated material would total 38,000 cubic yards.

  Approximately 3,700 cubic yards of the manure material would be used to fill the Manure Disposal Ponds through fill and compaction to within 1 foot of the surrounding grade of the dairy facility. Clean materials excavated from a nearby levee breach (See Levee Removal) would be used to "cap" the Manure Disposal Ponds. Following fill of the ponds, the entire Park Service-owned portion of the dairy facility would undergo fine grading. Because nutrient-rich conditions tend to favor establishment of weedy, ruderal non-native species, active revegetation would be conducted in the southern portion of the Manure Disposal Pasture that falls above intertidal elevations. The northern portion would be subject to tidal flooding, and increases in soil salinity would preclude or at least minimize establishment by ruderal non-native species.



Alternative A - Restoration and Management

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

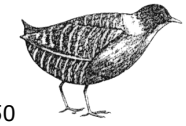
N

0 0.25 0.5 0.75 1 Miles

Figure 8

ALTERNATIVE A – LIMITED RESTORATION OF THE GIACOMINI RANCH EAST PASTURE ONLY WITH EXPANDED PUBLIC ACCESS, INCLUDING CULVERTED EARTHEN FILL TRAIL ON EASTERN PERIMETER, INCLUDING ACTIONS COMMON TO ALL ACTION ALTERNATIVE

Intentionally Left Blank



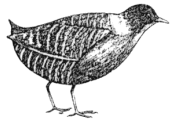
- ***Limited Breaching of Levee in Southern and Northern Portions of East Pasture (Remove or Breach Levee; Figure 6)***: Approximately 2,700 lineal feet of levee would be breached in the East Pasture at four locations. Two are in the northern portion of the East Pasture near the outlet of the existing historic slough-concrete spillway and the pumphouse. The other two are in the southern portion near the existing cattle-crossing location (where cattle cross from the East Pasture to the West Pasture) and across from White House Pool. The levees would be excavated to the adjacent pasture elevations. The top 1-2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2-3 feet would be disposed of on-site through loose spreading of excess material.

- ***Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Conduct Revegetation; Figure 8)***: Approximately 1,400 lineal feet of bank along Lagunitas Creek in the southwestern portion of the East Pasture would be graded to convert the current moderately steep slope (3:1) to a more gradual bank slope (approximately 8:1). The grading would be conducted such that existing large, mature willows established adjacent to Lagunitas Creek would not be disturbed, thereby preserving instream habitat for aquatic species such as steelhead and coho salmon, California freshwater shrimp (*Syncaris pacifica*; FE), and other aquatic species. Some of the graded material would be used to provide clean fill material to "cap" the manure ponds on the Dairy Mesa. Following completion of grading, the exposed soil would be stabilized using techniques that may include placement of erosion control blanket, and revegetation would be conducted through sprigging and installation of container plants. An on-site irrigation system may be used for the first three years to increase survival of plantings, as the bank has naturally aggraded due to historic sediment deposition and is some distance above the summer water table.

- ***Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 8)***: Tidegates, levees, and berms would be removed to allow tidal flows into the northern portion of the restored East Pasture. To create a gradient that would encourage drainage of creek flows during low tides, the mouth of Tomasini Creek and the historic slough would be excavated approximately 1- foot from 2 feet NAVD88 to create a linkage with the deepest portion of Lagunitas Creek, which averages 1 foot NAVD88 in this portion of the creek. In addition, existing vegetation and at least 1- to 2 – feet of sediment would be removed from approximately 1,200 lineal feet of historic slough in the northern end of the East Pasture to continue this gradient upstream and improve tidal circulation in the central portion of the restored East Pasture. Approximately 700 feet of new tidal channel would also be excavated in the northeastern portion of the restored East Pasture. Overall, construction and deepening of existing sloughs would be designed to create a balance in water residence time such that ponded areas are retained during low tide for aquatic species such as tidewater goby, but flushing occurs regularly enough that water quality and intertidal mudflat conditions are maximized.

- ***Removal of Invasive Species (Remove Invasive Species; Figure 8)***: As described under the No Action Alternative, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication. However, under this alternative, species other than cape ivy and pampas grass would be subject to monitoring and eradication. These species include non-native invasive cordgrass (*Spartina*) and cordgrass hybrids and Himalayan blackberry (*Rubus discolor*).

    - **Atlantic cordgrass (*Spartina alterniflora*); Atlantic cordgrass – Pacific cordgrass (*Spartina foliosa*)** hybrids; and dense-flowered cordgrass (*Spartina densiflora*): Atlantic cordgrass and Atlantic cordgrass-Pacific cordgrass hybrids, which have spread through large portions of central and south San Francisco Bay, have not been documented in the Project Area or Tomales Bay to date, but have been found in Drake's Estero. Another cordgrass species that is not native to the region, dense-flowered cordgrass, has sprung up twice along Tomales Bay's shorelines, but has been quickly eliminated. The Invasive Spartina Council, along with the Park Service, Audubon Canyon Ranch, and others, have been conducting annual monitoring for invasive and non-native cordgrass species and hybrids. The Park Service would continue to monitor for the presence of non-native cordgrass species and hybrids as part of its ongoing effort to eliminate this species. The Park Service uses non-chemical methods to eradicate non-native cordgrass, specifically tarping of "patches" with



follow-up treatment over the next three to five years to ensure that there is no clonal "creep" beyond the tarped area.

- **Himalayan blackberry (*Rubus discolor*):** Under Alternative A, the Park Service would remove and treat up to 4.6 acres of Himalayan blackberry occurrences on the southwestern of the East Pasture levee and Lagunitas Creek bank and the Dairy Mesa slope. In this location, Himalayan blackberry would be removed manually by cutting down aboveground portions of plants and digging out the rootball. Maintenance involves follow-up monitoring and treatment, if necessary, to ensure that the species does not reestablish.

- ***Revegetation in East Pasture (Conduct Revegetation; Figure 8)***: Selected portions of the East Pasture would be actively revegetated as described under earlier restoration tasks (Excavation and Restoration of Manure Disposal Pastures, Creek Bank Graded). Revegetation efforts in the 13-acre Manure Disposal Pastures would focus on removing "hot" or nutrient-rich soils to the extent possible and conducting limited revegetation with moist grassland or upland ecotone plant species such as wildrye (*Leymus triticoides*). Approximately 3 acres on the southern Lagunitas Creek bank would be graded to a more stable topographic profile, revegetated, and potentially irrigated for the first three summers to improve survival of plantings. This area would be revegetated with riparian tree and shrub species using a combination of sprigging with arroyo willow and red alder and container plantings of other native riparian species such as box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), twinberry (*Lonicera involucrata*), red elderberry (*Sambucus racemosa*), coyote brush (*Baccharis pilularis*), etc. Because top-of-bank elevations are considerably above the summer water table, irrigation may be performed during the first three summers to improve survival of plantings. Also, up to 1.6 acres on the Dairy Mesa slope, which has been heavily disturbed by agricultural activities, would be revegetated following invasives removal with low- to medium-height coastal scrub species that are adapted to wetter conditions: portions of the Dairy Mesa appears to be influenced by an active spring. Plant species selected would be those that would continue to allow views of the restored Project Area from the proposed viewing area at the top of the Dairy Mesa (see Public Access).

West Pasture

- There would be no restoration conducted in the West Pasture other than the removal of high priority invasive species described under the No Action Alternative and Alternative A – East Pasture.

Olema Marsh

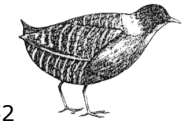
- There would be no restoration conducted in the Olema Marsh.

Management

- ***No Agricultural Land Management***: Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Removal of Main Dairy Structures from Upland Areas***: Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the NPS property will be removed from the premises as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek***: Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacominis will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.



- ***Minimal Maintenance and Maintenance of Existing Property Access Points***: Park Service personnel would need to perform maintenance in certain areas either on a regular or occasional basis and would continue to use existing access points where feasible such as 3rd and C Street and Mesa Road entrances in Point Reyes Station and existing access points for West Pasture in Inverness Park.

- ***Tidegates Maintained (Maintain Infrastructure Long-Term, Maintain Infrastructure Short-Term; Figure 8)***: Maintenance and cyclic replacement of the culverts, tidegate, and supporting wooden infrastructure such as flashboards would be continued on both Fish Hatchery and Tomasini Creeks, although maintenance of the Tomasini Creek tidegate would only be continued under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure for more detailed discussion).

- ***Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 8)***: Excess sediment from the 1906 Drainage and Fish Hatchery Creek would be excavated on an as needed basis as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses***: As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to an instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.

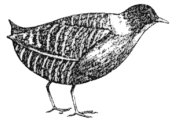
- ***Recover the Tomales Bay Tidewater Goby Population***: Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives.

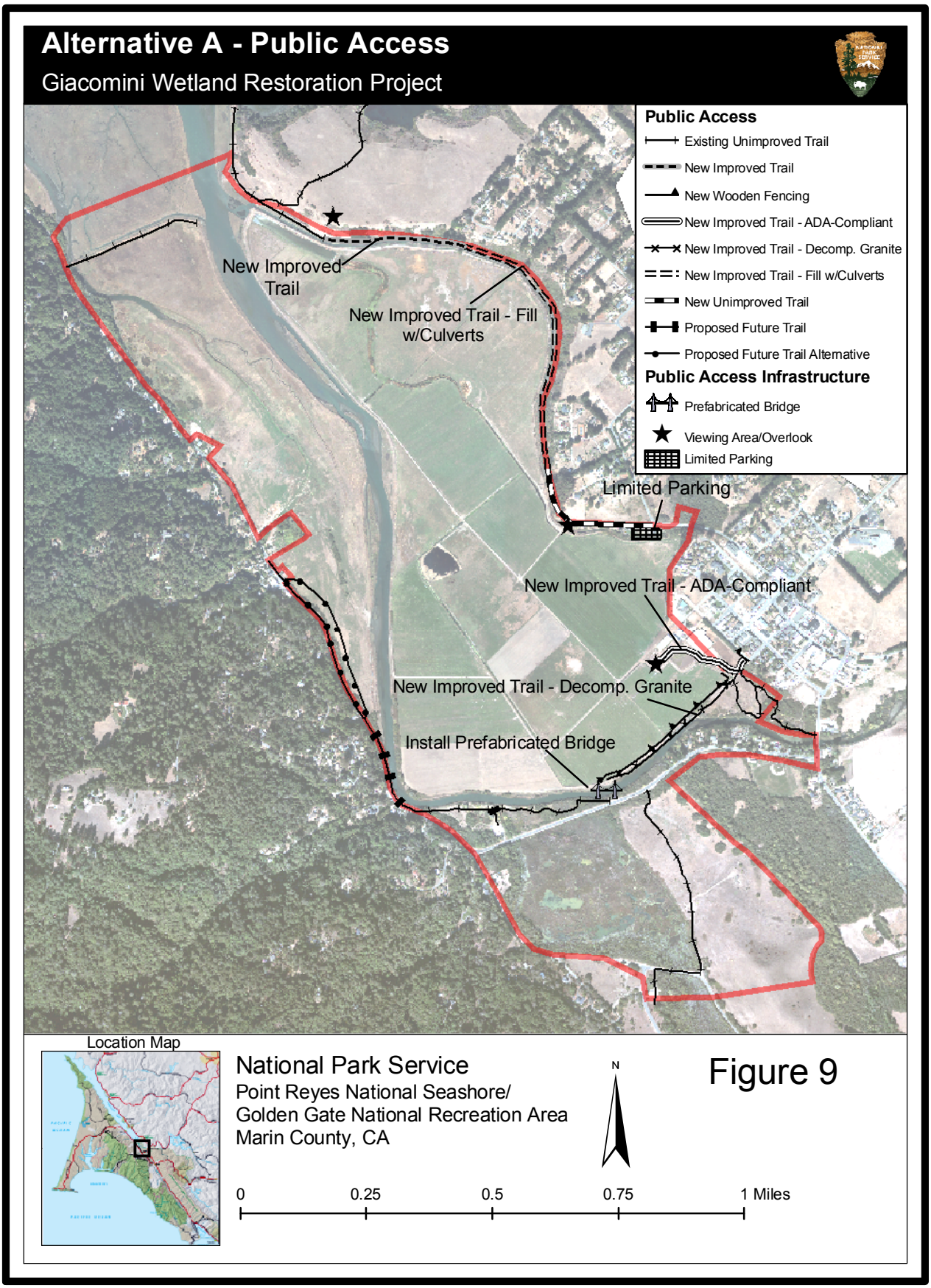
- ***Lease Subtidal and Intertidal Portions of Lagunitas Creek within Project Area from CSLC***: The Park Service would lease subtidal and intertidal portions of Lagunitas Creek within the Project Area from the CSLC, which currently owns these lands, as well as subtidal and intertidal lands north of the Giacomini Ranch. The northern boundary of the lease would be the Giacomini Ranch north levee and the northern extent of Park Service ownership. The southern boundary would be just north of the Green Bridge.

Public Access

- ***Creation of Southern Perimeter Trail from Point Reyes Station to existing White House Pool County park via a permanent pedestrian/bike bridge near the location of the old summer dam (Construct New Improved Trail- ADA-Compliant, Construct New Improved Trail-Decomposed Granite, Construct Bridge, Construct Fence; Figures 9 and 10)***: The Southern Perimeter Trail would connect Point Reyes Station with the White House Pool County park. A decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay (see Viewing Areas and Exhibits). The trail would continue along the edge of the East Pasture and Lagunitas Creek bank as does the existing informal social path. The trail would be improved and maintained either as an improved earthen trail or through application of some type of surfacing component such as decomposed granite. It would not be paved. The existing dirt path in the Green Bridge County Park, which totals more than 1,300 feet in length, would connect to the proposed trail.

  The approximately 2,600-foot improved trail from the Dairy Mesa would lead to a 200-foot, 8-foot-wide bridge on Lagunitas Creek at the location of the old summer gravel dam that the Giacominis used to install for irrigation purposes (Figure 10). The bridge would be a prefabricated unit that would need to be installed at a height of at least 16- to 17- feet NAVD88 to allow conveyance of 10-year flood




Alternative A - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Trail
New Wooden Fencing
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
New Improved Trail - Fill w/Culverts
New Unimproved Trail
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Prefabricated Bridge
Viewing Area/Overlook
Limited Parking
New Improved Trail
New Improved Trail - Fill w/Culverts
Limited Parking
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
Install Prefabricated Bridge
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 9

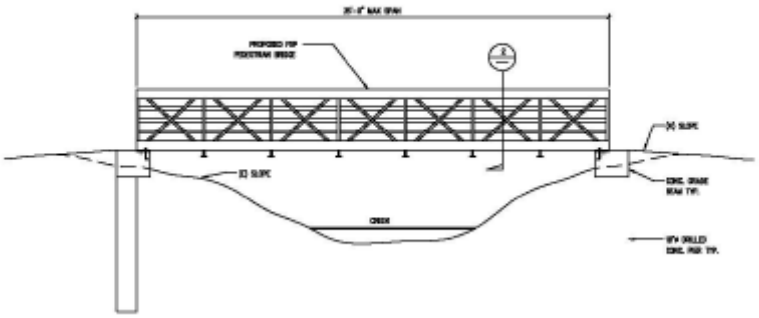


FIGURE 10. EXAMPLE OF PREFABRICATED BRIDGE STRUCTURE (LANDPEOPLE 2005)
THIS GRAPHIC DOES NOT REPRESENT FINAL DESIGN AND/OR APPEARANCE.

event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows. These elevations include the 1- to 2-feet additional vertical feet of height that would be needed to provide some freeboard. The bridge would not be expected to pass all flood flows, with flows greater than 20- to 500-year flood events expected to flow over the structure depending on the final installed elevation of the bridge. Based on this range of elevations, the bridge would be approximately 5- to 9 feet taller than the adjacent ground surface elevations in the White House Pool County park, however, it would not be expected to exceed the uppermost vertical extent of the riparian canopy in this area, which extends to approximately 35- to 41 feet NAVD88. Footings for the bridge would not be placed in the active floodplain, but footings may need to be sizeable due to the liquefaction potential in this portion of the Bay. Length of the southern perimeter trail would total approximately 2,800 linear feet.

On the north side, the trail would connect to the existing dirt path in the White House Pool County Park. In the DEIS/EIR, the project proponents proposed to connect these trails via a crosswalk to the Olema Marsh Trail, which runs on the east side of Olema Marsh towards Limantour Road, however, this has been eliminated in the FEIS/EIR based on additional need and safety analyses.

Because of the potential for flooding during large storm events, use of this path would be weather-dependent. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Because the Southern Perimeter spur trail is connected to the Green Bridge County park, which currently allows dogs, dog use would continue to be allowed on the Southern Perimeter through- and spur-trail components. All dogs would be required to be on a 6-foot leash at all times (36CFR 2.15 (a) 2), and owners would be subject to fines for off-leash dogs. However, if at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the area could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1).

- ***Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County (Construct Proposed Future Trail, Construct Proposed Future Trail Alternative-Boardwalk, Construct Proposed Future Trail-ADA Compliant; Figure 9)***: The Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park by connecting to the existing informal path in the White House Pool County park with a path along Sir Francis Drake that would either run alongside Sir Francis Drake Boulevard or move off the road at the southern end of the unrestored West Pasture onto a low-elevation boardwalk that would join back with Sir Francis Drake Boulevard in Inverness Park. The future project could include a potential elevated overlook at White House Pool County park that would connect to the existing parking lot with an ADA-compliant path.

- ***ADA-Compliant Access (Construct Proposed Future Trail-ADA Compliant; Figure 9)***: A decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed as part of the Southern Perimeter Trail from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay (see Viewing Areas and

Exhibits). This portion of the trail would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. The trail would be constructed to ensure that the grade and surfacing is compliant with standards regarding access for people with disabilities such as those established by the Access Board for Outdoor Recreational Facilities. As part of the potential future extension of the Southern Perimeter Trail to Inverness Park, an elevated overlook could be constructed at White House Pool County park that would be ADA-compliant and connect to the existing parking lot via an ADA-compliant path.

- ***Creation of Eastern Perimeter Trail Through Extension of Tomales Bay Trail from Railroad Point to Mesa Road (Construct New Unimproved Trail, Construct New Improved Trail-Soil, Construct New Improved Trail-Fill w/Culverts; Figure 9)***: The existing unimproved Tomales Bay Trail originates on Highway 1 and runs through GGNRA lands leased to the Martinelli family to Railroad Point. This new through-trail would be extended approximately 1,700 feet south along the historic and defunct railroad grade that runs along the eastern perimeter of the East Pasture at the base of the Point Reyes Mesa. Approximately 1,700 feet south of the existing terminus of the Tomales Bay Trail, a new improved trail, approximately 3,200 lineal feet in length, would be constructed through removal of riparian vegetation, placement of earthen fill overlain with decomposed granite, and installation of culverts where needed to direct surface and groundwater flows originating from the adjacent Point Reyes Mesa into Tomasini Creek. At the southern end, the trail would connect to the existing ranch access road that runs from Mesa Road to the Giacomini Hunt Lodge, a house that was constructed by the Giacomini family and is under a 25-year Reservation of Use Agreement. Up to five (5) parking spaces may be created at the junction of the railroad grade and Mesa Road in an existing gravel lot that is currently used for storage of gardening vehicles and equipment. Length of the Eastern Perimeter Trail would total approximately 6,000 lineal feet.

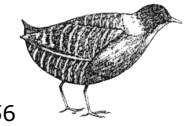
  The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Dogs would not be allowed in any areas that are not currently open to the public or where dogs are not currently allowed, which includes the Eastern Perimeter Trail. Dogs are currently not allowed on the Tomales Bay Trail, which connects to the Eastern Perimeter Trail.

- ***Existing Public Access Maintained along Informal Path (Existing Unimproved Trail; Figure 9)***: Public access would continue along the existing informal dirt path on the north levee of the West Pasture. The proposed trail would be open for use by pedestrians. Dogs would not be allowed on the north levee of the West Pasture, because of the trail's proximity to habitat for federally and state listed California clapper rail (*Rallus longirostris obsoletus*; FE, SE) and California black rail (*Laterallus jamaicensis coturniculus*; ST).

- ***Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 9)***: A total of three viewing areas, overlooks, and interpretative exhibits would be constructed along the eastern perimeter of the Project Area. A viewing area and interpretative exhibits would be constructed at the edge of the Dairy Mesa along the southern perimeter trail. This viewing area would consist of simple facilities such as benches, picnic table, and interpretative exhibits. A second viewing area would be constructed adjacent to the Giacomini Hunt Lodge along the eastern perimeter trail. This might potentially be a slightly raised overlook to allow a better view of the restored Project Area, as well as interpretative exhibits. A third viewing area would be constructed along the existing Tomales Bay Trail at the top of Railroad Point and would also be very simple, consisting potentially of a wooden bench and interpretative sign.

Construction

- ***Construction Scheduling***: Since release of the DEIS/EIR, construction schedules have changed, such that construction of the restoration component is now anticipated to take two (2) construction seasons rather than one (1) . The first construction season would be conducted during approximately a 90-day period from August through October 31. The second construction season would be conducted during approximately a 150-day period from June 1 through October 31, starting in the southern end and moving north in the fall. Construction would be staggered such that components in the southern end of the Project Area would be initiated first to ensure that construction activities do not disturb special status rail populations that occur in the undiked marsh north of the Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat



between February 15 and August 1, and there are regulations regarding timing of construction or proximity of construction to active nests during the breeding season for other birds, as well. Depending on when funding is obtained for public access, construction of public access alignments and infrastructure would occur either during or after restoration. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Fridays, with weekends permissible only authorization by the Seashore and CSLC.

- ***General Description of Construction-Equipment and Water Control Measures:*** Construction equipment that would be expected to be used in construction includes, but is not limited to, excavators, front loaders, bulldozers, graders, dump trucks, and water trucks: some of this equipment may need to be specialized for use in muddy or aquatic areas due to the shallow groundwater table. The water truck would be used for dust control in the Project Area. Ancillary equipment that may be used would include a diesel generator, water pump, and a piledriver.

  Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road (see further description under Total On-Site and Off-Site Disposal below). Occasional delivery of supplies and materials would be necessary, such as for erosion control materials, water diversion, and fuel. It is assumed that a water truck would refill three to five times per day, necessitating a drive offsite.

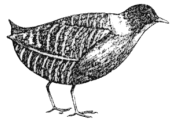
  During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough and removal of riprap and bank stabilization in the riprapped area along the southern portion of the East Pasture.

- ***General Description of Construction-Equipment- Access, Staging, Stockpiling, Traffic Control, and Trail Closures:*** Under Alternative A, construction activities would occur only in the East Pasture (Figures 8 and 9). Construction equipment would most likely access the East Pasture from two locations: 1) the ranch access road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station, and 2) C Street in Point Reyes Station. Equipment would most likely be staged at the Park Service-owned portions of the dairy ranch facility adjacent to C Street and near the Giacomini Hunt Lodge near Mesa Road.

  Traffic control measures may be required in the following areas and circumstances: 1) on Levee Road during installation of the prefabricated bridge and 2) along Sir Francis Drake Boulevard under the programmatic component in which the Southern Perimeter Trail could potentially be extended to Inverness Park in the future. A one-day closure of Levee Road would be required to accommodate delivery of the 200-foot pre-fabricated pedestrian bridge. Large pre-fabricated bridges are typically delivered in lengths from 80-100 feet, so the entire width of the county roadway would be needed during delivery and initial installation. During Levee Road closure, traffic will be rerouted via signage and flaggers to Bear Valley Road. A large crane (100-ton capacity) would likely be used to install the bridge. Vehicle passage on Levee Road may also be reduced periodically to a single lane over a distance of up to 0.2 miles during construction of the bridge abutments and path connections and completion of deck installation (1-3 days typically). Signage and flagging would be provided anytime construction activities interfere with traffic. Traffic control measures to minimize impacts and ensure public safety will be further developed during design.

  Construction of the restoration and public access components could cause temporary closure of the informal trail on the southern perimeter of the East Pasture.

- ***Total Cut/Fill***: Actions proposed under Alternative A would result in excavation of approximately 87,000 cubic yards of soil and more than 680 cubic yards of concrete, pipe, demolition debris, and other non-soil materials and fill of approximately 31,000 cubic yards of soil (Figure 6). Fill primarily involves re-use of excavated materials on-site such as fill of manure ponds on the Dairy Facility Mesa and fill of drainage ditches. Under Alternative A, the center portion of the Eastern Perimeter Trail, which is approximately 3,200 feet in length, would also need approximately 1-2 feet of earthen fill overlain with gravel to create a passable trail.



- ***Total On-Site and Off-Site Disposal***: To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative A total approximately 40,775 and 52,250 cubic yards of soil, respectively (Figure 6). In addition, excavated non-soil materials totaling more than 680 cubic yards would also need to be recycled or disposed of off-site.

  Soils removed off-site would be hauled from the East Pasture to several abandoned quarries in the Tomales Point portion of the Seashore. There are at least three quarries that would be prioritized for restoration -- Grossi Pit at M Ranch, Evans Pit at Pierce Point, and McClure Pit near L Ranch – as well as several medium to low priority quarries – Evans Pit at Abbott's Lagoon, L Ranch Quarry, and Home Ranch (Figure 7). Excavated sediment under this alternative would be used to restore the Grossi, Evans, and McClure DG. Sediments would be hauled to these quarries using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road. From Pierce Point Road, trucks would use existing unpaved roads to reach quarries. Most of these materials hauled off-site would be weedy or manure materials that would be buried at the bottom of the quarries and overlain with clean fill materials to minimize potential environmental impacts. A separate quarry close-out plan has been developed to ensure structure integrity of fill to the quarries and minimization of weeds from the Project Area being spread elsewhere. Compliance on the quarry close-out plans is being conducted separately, and completion is not required to be completed before disposal takes place. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

Alternative B – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter

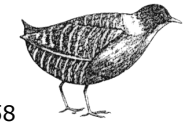
This alternative would completely remove the East Pasture levees and create several breaches in the West Pasture levee, as well as remove the tidegate on Fish Hatchery Creek (Figure 11). In general, this alternative builds upon the actions proposed in Alternative A by increasing tidal channel creation, grading, and revegetation Public access components of Alternative A and B are similar, but the culverted-earthen fill portion of the Eastern Perimeter through-trail in Alternative A is replaced with a boardwalk in Alternative B (Figures 12 and 13, Table 1).

Restoration

East Pasture

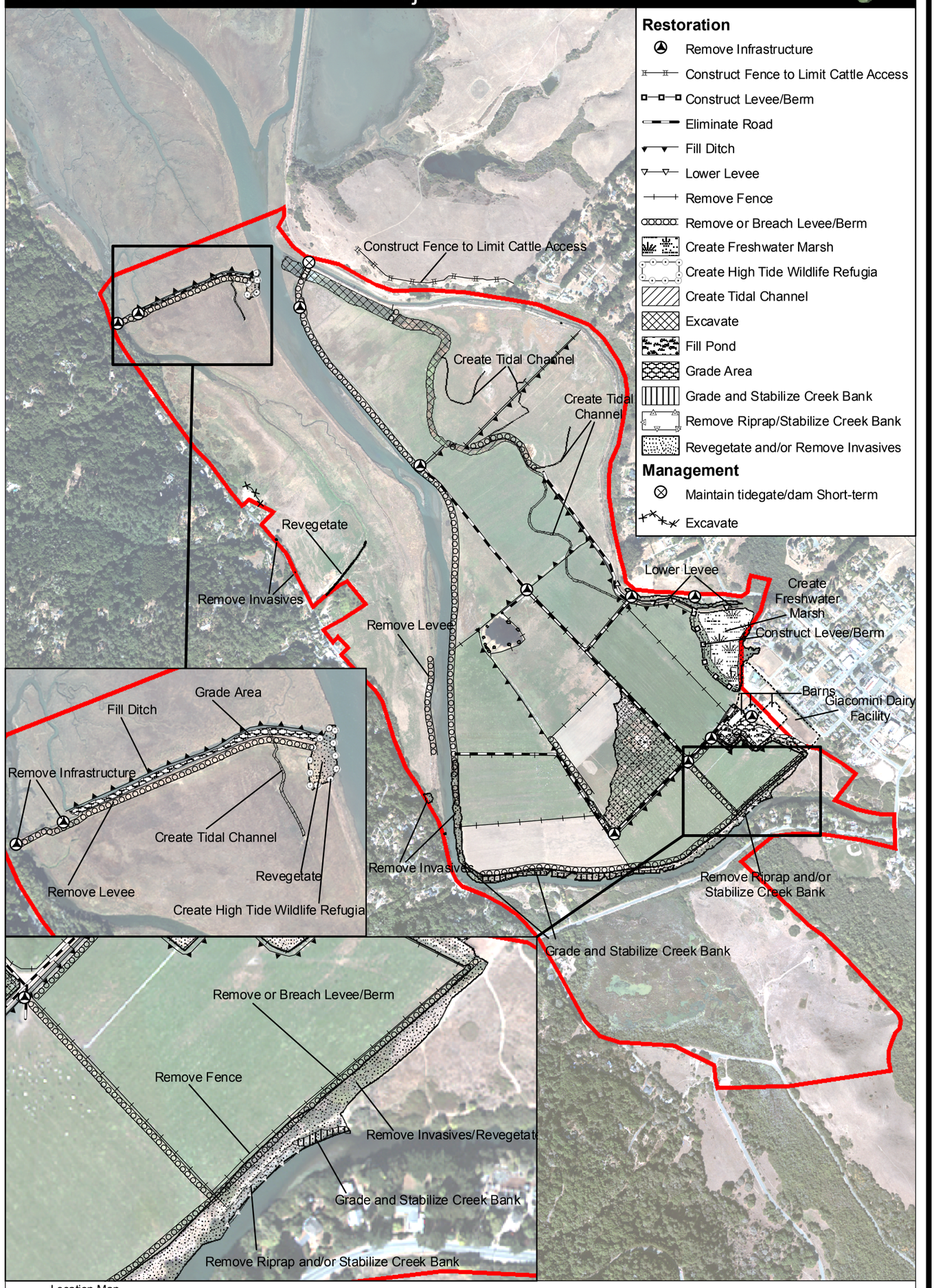
- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure Short-Term, Eliminate Road Through Regrading)***: Activities conducted under Alternative B would be identical to that described under Alternative A, with the exception that the road leading up to the dairy barn facility and Park Service-owned upland areas at the dairy facility would be regraded using material excavated on-site to recreate natural hillside topography, stabilized using erosion control material, and revegetated.

- ***Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation)***: Activities conducted under Alternative B would be identical to that described under Alternative A.



Alternative B - Restoration and Management

Giacomini Wetland Restoration Project

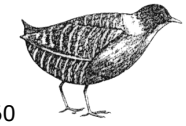


National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

Figure 11

ALTERNATIVE B – MODERATE RESTORATION OF THE GIACOMINI RANCH EAST PASTURE AND LIMITED RESTORATION OF THE WEST PASTURE WITH EXPANDED PUBLIC ACCESS, INCLUDING BOARDWALK TRAIL ON EASTERN PERIMETER

Intentionally Left Blank



- ***Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Remove Invasive Species, Conduct Revegetation; Figure 11)***: Bank grading and stabilization activities conducted under Alternative B would be very similar to that described under Alternative A.

  Approximately 0.2 acres of additional bank grading, stabilization, invasive plant removal, and revegetation would be conducted on portions of Lagunitas Creek opposite or just downstream of White House Pool. Grading and stabilization activities would focus on portions of the creek bank currently dominated by non-native invasive plant species such as Himalayan blackberry, avoiding adjacent areas supporting mature arroyo willow shrubs and trees.

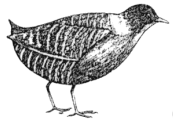
- ***Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee; Figure 11)***: An approximately 300-foot section of the East Pasture Lagunitas Creek bank was riprapped following the 1982 flood, which involved use of large rock or boulders on creek banks to minimize erosion or loss of levee. Under Alternative B, most of the estimated 650 cubic yards of riprap would be removed and hauled off-site to the Seashore's maintenance yard at the Bear Valley administrative complex. The riprapped area and an approximately eroded 100-foot section of creek bank just upstream would be regraded to a more stable topographic profile. The regraded slope would be stabilized, possibly with biostabilization techniques that may include placement at rock at the toe of slope, sprigging of willows and/or construction of so-called "willow walls" (construction of "fence" using willow material that is backfilled with soil), or other appropriate stabilization measures. A coffer dam may be needed to adequately dewater this area to allow for trench excavation.

  Alternative B would completely remove the East Pasture levees and create several breaches in the West Pasture levee, as well as remove the tidegate on Fish Hatchery Creek.

  Plantings of native riparian tree and shrub species would be conducted to increase bank protection afforded by establishment of vegetation. Given the history of flooding and erosion along this section of Lagunitas Creek, the Park Service acknowledges that these stabilization attempts may not be able to prevent future erosion in this area, particularly during larger storm events such as 10-year, 50-year, or 100-year floods. Hydrologists have even debated the potential for Lagunitas Creek to dramatically change course in the future by cutting through the East Pasture in this location. However, in keeping with the project's purpose and its focus on restoring process, should the bank erode or the creek change course in the future, there would be no attempts to repair any damage to the creek bank or move the creek back into its original course. In addition, any public access facilities such as trails or viewing areas would be adaptively managed such that facilities would be rerouted or reconfigured to work with changes in resource conditions.

- ***Complete Removal of Levee in East Pasture (Remove or Breach Levee; Figure 11)***: Under Alternative B, levees in the East Pasture would be completely removed. Approximately 9,600 lineal feet of levee would be excavated to the adjacent pasture elevations. The top 1-2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2-3 feet would be disposed of on-site through spreading. Certain portions of the creek bank, where levees are lower and have established riparian vegetation, would not be excavated to preserve erosion protection for banks and existing habitat for aquatic and terrestrial wildlife species.

- ***Lowering of Tomasini Creek Berm (Lower Levee; Figure 11)***: Under Alternative B, a section of the levee that separates Tomasini Creek from the East Pasture would be lowered to allow overflow from Tomasini Creek into the East Pasture during periods when water levels in the creek rise substantially during storms. Approximately 1,600 lineal feet of levee near the Giacomini Hunt Lodge would be lowered 4 feet. Another approximately 80 feet upstream of the existing worker housing would also be lowered 4 feet. This lowering would allow waters from Tomasini Creek to spill out onto the East Pasture floodplain during storm events where flows equal or exceed Ordinary High Water or



bankfull discharge (flood events that recur on average every 1.5 years). The top 2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2 feet would be disposed of on-site through spreading.

- ***Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 11)***: In addition to the tidal channel enhancement and creation activities under Alternative A, approximately 2,200 feet of new tidal channel would also be excavated in the northeastern and central portions of the restored East Pasture, recreating some of the historic meander or sinuosity that was once present in the historic slough before it was artificially straightened to act as a drainage ditch. Overall, construction and deepening of existing sloughs would be designed to create a balance in water residence time such that ponded areas are retained during low tide for aquatic species such as tidewater goby, but flushing occurs regularly enough that water quality and intertidal mudflat conditions are maximized.

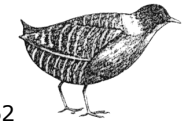
- ***Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle (Create Freshwater Marsh, Create Low Freshwater Marsh Berm; Figure 11)***: Restoration actions in the West Pasture have the potential to impact existing breeding habitat for the California red-legged frog in the Freshwater Marsh, a natural drainage- and seep-fed feature on the western perimeter of the West Pasture. Salinities in this marsh have stayed artificially low because of the construction of levees and tidegates in the West Pasture. These freshwater conditions have encouraged establishment within the marsh by California red legged frog, which are, in many cases, sensitive to higher salinities, particularly during juvenile stages. To offset anticipated increases in salinity in the northernmost portions of the Freshwater Marsh with breaching of the West Pasture levee and removal of the Fish Hatchery Creek tidegate, the Park Service and CSLC are proposing to create a 5.4-acre freshwater marsh on the eastern perimeter of the East Pasture in between Tomasini Creek and the dairy facility. Based on hydraulic modeling, the so-called Tomasini Triangle would be above intertidal elevations or the influence of tides except perhaps during the most extreme storm tides (extreme tides combined with high freshwater flows from storm events). Perennial seep and spring groundwater flow from the Point Reyes Mesa would provide a sustained source of freshwater through the summer which is important for maturation of juvenile California red-legged frogs.

  Creation of freshwater marsh in the Tomasini Triangle would involve excavating anywhere from 1- to 4 feet to create a perched surface water pond. Principal hydrologic sources for this marsh would be surface run-off from the relatively small 13-acre watershed, direct precipitation, groundwater from springs on the Point Reyes Mesa hillside, and occasional flood overflow from Tomasini Creek. The marsh bottom would be sloped such that the deepest portion would on the eastern perimeter of the triangle, where several groundwater springs emerge from the sides and base of the Point Reyes Mesa, with marsh depths gradually decreasing in 1-foot increments toward the marsh's western perimeter. Excavation would total approximately 17,000 cubic yards. In areas where excavation exceeds 2 feet, the marsh would be overexcavated by 1 foot to allow replacement of salvaged topsoil once excavation is completed. Salvaged topsoil would be stockpiled on-site directly adjacent to the marsh during this phase of construction.

  Because this area was historically influenced by tides much more than would occur under current conditions, soils at deeper depth in the Tomasini Triangle appear to be relatively high in salts despite the freshwater environment that has predominated since diking of the Giacomini Ranch. To minimize migration of salts from these soil strata into overlying surface waters, salvaged topsoil from the eastern portions of the marsh would be mixed with bentonite to decrease permeability and connectivity with the saline groundwater table and increase the amount and duration of surface water ponding.

  An approximately 80-foot section of the Tomasini Creek levee upstream of the existing worker housing would be partially lowered to allow flood overflows into the Tomasini Triangle during the winter and spring and provide another source of freshwater for the marsh.

  To increase the duration and depth of surface water ponding and decrease the potential impact of extreme storm tides on salinity structure of the created marsh, a 1.7-acre berm would be constructed on the marsh's entire western perimeter. The berm would be developed using approximately 4,100 cubic yards of soil excavated to create the freshwater marsh, as well as materials from lowering of the Tomasini Creek levee. To the extent possible, the berm would be graded to create a more subtle,



gradual topography on the western side that would enable creation of high marsh and upland ecotone habitats. The berm would have a top elevation of approximately 9 - 10 feet NAVD88, approximately 5 feet above the deepest portion of the marsh and approximately 1.5 – 2 feet above the surrounding marshplain elevations. This feature would not only increase surface ponding depth and duration and minimize tidal intrusion into the created freshwater marsh, but provide refugia for wildlife during extreme high water periods.

Once construction is completed, the freshwater marsh and berm would be revegetated using native species characteristic of freshwater marsh and high marsh/upland ecotone communities, respectively.

- ***Installation of Fencing on Martinelli Ranch (Construct Fence to Limit Cattle Access; Figure 11)***: Approximately 1,800 linear feet of fence would be constructed at the top of the Point Reyes Mesa on GGNRA lands leased to the Martinelli family for cattle grazing. Fencing would preclude cattle grazing on the south-facing slope, which, if trampling impacts were decreased, could provide valuable breeding habitat for northwestern pond turtles, which occur in the Giacomini Ranch.

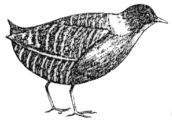
Lagunitas Creek

- ***Removal of Invasive Species (Remove Invasive Species; Figure 11)***: As described under the No Action Alternative and Alternative A, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. These species include invasive cordgrass and cordgrass hybrids, cape ivy, pampas grass, and Himalayan blackberry. Removal efforts for these species are described under the No Action Alternative and Alternative A. Under Alternative B, these efforts would be expanded to include additional occurrences of Himalayan blackberry in the East Pasture. Removal of invasive species in the West Pasture is described below.

    - ***Himalayan blackberry***: Under Alternative B, the Park Service would remove and treat additional Himalayan blackberry occurrences in the East Pasture and perimeter. These areas total up to 8.9 acres and include occurrences along the entire southern perimeter of the East Pasture levee and creek bank adjacent to Lagunitas Creek. Depending on the location, Himalayan blackberry would be removed using either mechanized equipment to excavate the above- and below-ground portions of the shrub or, particularly on hillsides or areas with sensitive biological resources, manual labor to cut down aboveground portions of plants and dig out the rootball. Follow-up treatments may be conducted to remove resprouting plants.

- ***Revegetation in East Pasture (Conduct Revegetation; Figure 11)***: Selected portions of the East Pasture would be actively revegetated as described under Alternative A. In addition, revegetation would be conducted on the entire northern bank of Lagunitas Creek (approximately 6.0 - 7.0 acres) following removal of invasive plant species, levee removal, and/or regrading of the creek bank to a more stable topographic profile. This area would be revegetated using a combination of sprigging with arroyo willow and red alder and container plantings of other native riparian species such as box elder, Oregon ash, twinberry, red elderberry, coyote brush, etc. Because top-of-bank elevations are considerably above the summer water table, irrigation might be performed during the first three summers to improve survival of plantings.

  Vegetation establishment in the created 5.4-acre Tomasini Triangle freshwater marsh would be jumpstarted through planting of appropriate freshwater marsh plant species such as various rush species (*Scirpus microcarpus* and *americanus*) and bur-reed (*Sparganium erectum* ssp. *stoloniferum*). These mid- to tall emergent plant species spread at a moderate to rapid rate through expansion of underground stems (rhizomes) and seed dispersal, so they would be expected to spread fairly rapidly once established in the marsh. In addition, low-growing species such as hydrocotyle (*Hydrocotyle ranunculoides*), water parsley (*Oenanthe sarmentosa*), and tall emergents such as cattails (typically *Typha latifolia* and *angustifolia*) would also be expected to colonize rapidly on their own as they



already occur in the area. The lower elevations of the west-facing slope of the approximately 1.7-acre freshwater retention berm would be planted with species characteristic of the high salt marsh or upper intertidal zones that are typically flooded by tides only during some of the highest high tides. These species include saltgrass (*Distichlis spicata*), red fescue (*Festuca rubra*), gumplant (*Grindelia*), western marsh rosemary (*Limonium californicum*), and pickleweed (*Salicornia virginica*). Above intertidal elevations, the berm would be planted with wildrye and gumplant. Both saltgrass and wildrye spread primarily through expansion of aboveground or belowground stem systems.

West Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence; Figure 11)***: The amount of agricultural infrastructure present in the West Pasture is much lower than that in the East Pasture. Under Alternative B, the culverted tidegate on Fish Hatchery Creek would be removed, as well as the 90-foot concrete spillway and adjacent concrete ditch. Approximately 700 feet of temporary fence constructed earlier to minimize cattle impacts on restoration activities in the northern portion of the West Pasture would be removed in 2008. Removal of infrastructure would generate approximately 120 cubic yards of non-soil material that would need to be disposed of off-site at the Redwood Landfill (Petaluma, Calif.).

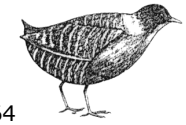
- ***Limited Breaching of Levee in Southern and Northern Portions of West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch; Figure 11)***: Approximately 2,400 linear feet of levee would be breached in the West Pasture in two principal breach locations. One breach is in the northern portion of the West Pasture where the entire approximately 1,400-foot North Levee would be removed. The levees would be excavated to the adjacent pasture elevations. Levee material excavated from this area would be used to fill the borrow ditch to the north, which was the ditch created by "borrowing" of material for levee creation. In addition, approximately 0.5 acres of fringe marshplain between the levee and the borrow ditch would be excavated shallowly (1 foot), and the excavated topsoils would be stockpiled nearby in the West Pasture. The approximately 1,275-foot borrow ditch would be filled to just slightly below adjacent marshplain grade or elevations (~ -0.5 feet) to allow sedimentation to create more natural topography. Approximately 3,000 cubic yards of soil would be used to fill the borrow ditch. The stockpiled topsoil from the marshplain fringe would be scattered over the top to provide a source of seed and vegetative fragments to promote vegetation establishment. The remaining soils from levee excavation would be used to expand the high tide refugia for rails (see description below) or loosely spread over the West Pasture, with the weedy upper portions of the levee disposed of off-site.

  The other breach location is in the very southern end of the West Pasture, where approximately 1,000 feet of levee would be removed. The levees would be excavated to the adjacent pasture elevations. The top 1-2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2-3 feet would be disposed of on-site through loose spreading of excess material.

- ***Creation of New Tidal Channels (Create Tidal Channel; Figure 11)***: Approximately 500 feet of new tidal channel would be excavated in the northeastern corner of the West Pasture and connected to an existing tidal channel in the undiked marsh to the north. The new channel would be created in an existing topographic linear depression that may be the historic remnant of the undiked tidal marsh channel. Approximately 300 cubic yards of soil would be excavated to recreate this feature.

- ***Removal of Invasive Species (Remove Invasive Species; Figure 11)***: As described under the No Action Alternative and Alternative A, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication. These species include invasive cordgrass species and cordgrass hybrids, cape ivy, pampas grass, and Himalayan blackberry. Under Alternative A, most of the invasive removal efforts would be focused on cape ivy and pampas grass, which occurs primarily in the riparian habitat alongside Sir Francis Drake Boulevard. Alternative B includes removal of English ivy.

  - ***English ivy (Hedera helix)***: The Park Service would eradicate English ivy from riparian habitat in the West Pasture alongside Sir Francis Drake Boulevard. English ivy patches total approximately 0.04 acres. English ivy is typically treated non-chemically by manually cutting



ivy at shoulder height and slightly above ground level to remove from trees and then clearing an area at least 6 feet from the base of the tree on all sides. In areas where no native or desirable vegetation occurs, ivy roots would be chopped back with a sharp spade, and the ivy would be rolled up. In areas where native or desirable vegetation does occur, ivy would be carefully cleared from around these plants first, trying to remove as much of the roots as possible as ivy can resprout from root pieces. A thick application of rice straw is sometimes applied on the exposed soils to decrease soil erosion during subsequent winter rains. Maintenance involves follow-up monitoring and treatment, if necessary, to ensure that the species does not reestablish.

- ***Revegetation in West Pasture (Conduct Revegetation; Figure 11)***: Some limited revegetation would also occur on the upstream portions of Fish Hatchery Creek within the Giacomini Ranch. Riparian species such as arroyo willow and red alder would be installed through use of pole cuttings just downstream of the established riparian stand that occurs within private property. This area totals approximately 0.2 acres.

Olema Marsh

- There would be no restoration conducted in the Olema Marsh.

Management

- ***No Agricultural Land Management***: Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Removal of Main Dairy Structures from Upland Areas***: Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the Park Service property, including adjacent to the Giacomini Hunt Lodge, will be demolished and removed from the premises as described under Alternative A and Actions Common to All Alternatives under the No Action Alternative.

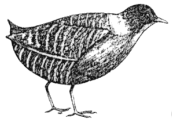
- ***Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek***: Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacominis will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.

- ***Minimal Maintenance and Maintenance of Existing Property Access Points***: Park Service personnel would need to perform maintenance in certain areas either on a regular or occasional basis and would continue to use existing access points where feasible such as 3rd and C Street and Mesa Road entrances in Point Reyes Station and existing access points for West Pasture in Inverness Park.

- ***Tidegates Maintained (Maintain Infrastructure-Short-Term; Figure 11)***: Maintenance of the Tomasini Creek tidegate would be continued under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure under Alternative A for more detailed discussion).

- ***Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 11)***: Excess sediment would be removed from the 1906 Drainage and Fish Hatchery Creek on an as-needed basis (annually during average to wet years) as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses***: As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right



purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to an instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Recover the Tomales Bay Tidewater Goby Population***: Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Lease Subtidal and Intertidal Portions of Lagunitas Creek within Project Area from CSLC***: The Park Service would lease subtidal and intertidal portions of Lagunitas Creek within the Project Area from the CSLC, which currently owns these lands, as well as subtidal and intertidal lands north of the Giacomini Ranch. The northern boundary of the lease would be the Giacomini Ranch north levee and the northern extent of Park Service ownership. The southern boundary would be just north of the Green Bridge.

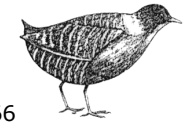
Public Access

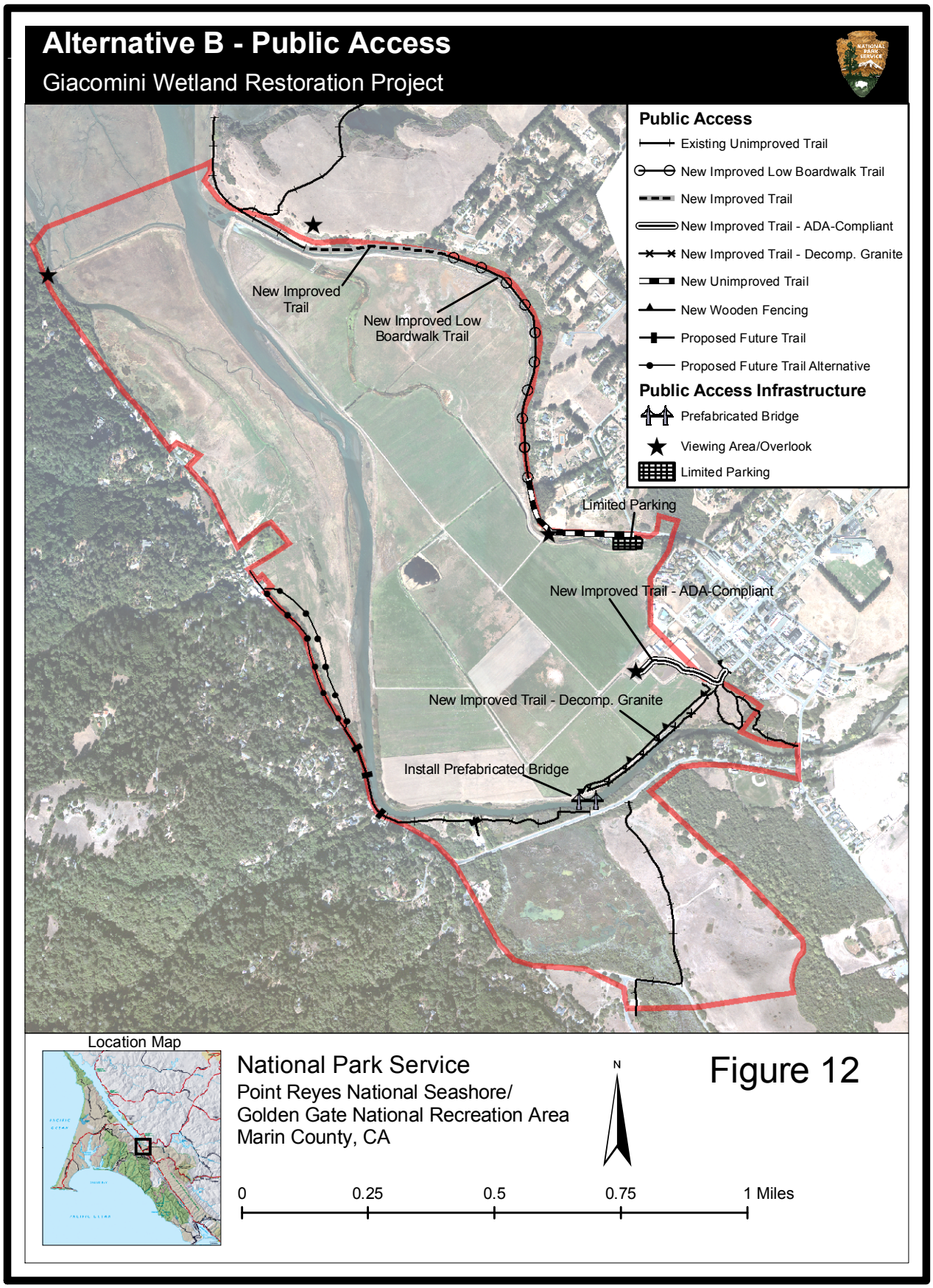
- ***Creation of Southern Perimeter Trail from Point Reyes Station to existing White House Pool County park via a permanent pedestrian/bike bridge near the location of the old summer dam (Construct New Improved Trail- ADA-Compliant, Construct New Improved Trail-Decomposed Granite, Construct Bridge, Construct Fence; Figure 12)***: The Southern Perimeter Trail would connect Point Reyes Station with the White House Pool County park as described under Alternative A. Because of the potential for flooding during large storm events, use of this path would be weather-dependent. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Because the Southern Perimeter spur trail is connected to the Green Bridge County park, which currently allows dogs, dogs on leach would continue to be allowed on the Southern Perimeter through- and spur-trail components. If at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the area could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1).

- ***ADA-Compliant Access (Construct New Improved Trail- ADA-Compliant; Figure 12)***: As described under Alternative A, a decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed as part of the Southern Perimeter Trail from C Street in the vicinity of 3rd Street to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay. The trail would be constructed to ensure that the grade and surfacing is compliant with standards regarding access for people with disabilities such as those established by the Access Board for Outdoor Recreational Facilities. As part of the potential future extension of the Southern Perimeter Trail to Inverness Park, an elevated overlook could be constructed at White House Pool County park that would be ADA-compliant and connect to the existing parking lot via an ADA-compliant path.

- ***Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County (Construct Proposed Future Trail, Construct Proposed Future Trail Alternative-Boardwalk, Construct Proposed Future Trail-ADA Compliant; Figure 12)***: The Park Service would potentially collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park as described under Alternative A.

- ***Creation of Eastern Perimeter Trail Through Extension of Tomales Bay Trail from Railroad Point to Mesa Road (Construct New Unimproved Trail, Construct New Improved Trail-Soil, Construct New Improved Trail-Elevated Boardwalk; Figures 12 and 13)***: An eastern perimeter through-trail connecting to the existing Tomales Bay Trail would be constructed on the historic railroad grade largely as described under Alternative A. However, the center section of the trail, which is approximately 3,200 lineal feet in length, would be constructed as a slightly elevated boardwalk rather than an earthen fill-culverted trail as described under Alternative A (Figure 13). The boardwalk would be approximately 8-feet-wide and 12- to 18 inches above the existing grade of the railroad grade. The boardwalk would allow direct surface and groundwater flows originating from the




Alternative B - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Low Boardwalk Trail
New Improved Trail
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
New Unimproved Trail
New Wooden Fencing
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Prefabricated Bridge
Viewing Area/Overlook
Limited Parking
New Improved Trail
New Improved Low Boardwalk Trail
Limited Parking
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
Install Prefabricated Bridge
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 12

adjacent Point Reyes Mesa into Tomasini Creek to flow underneath the boardwalk. The boardwalk would be constructed of either pressure-treated wood or recycled plastic lumber. The boardwalk would be supported on concrete pier footings. An asphalt chip seal material may be used to coat the boardwalk surface if wood is selected as the construction material, because it would minimize potential slippage of and wear and tear from horses. Because of the low elevation of the boardwalk, railings would not be needed for safety purposes. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Dogs would not be allowed in any areas that are not currently open to the public or where dogs are not currently allowed, which includes the Eastern Perimeter Trail. Dogs are currently not allowed on the Tomales Bay Trail, which connects to the Eastern Perimeter Trail.

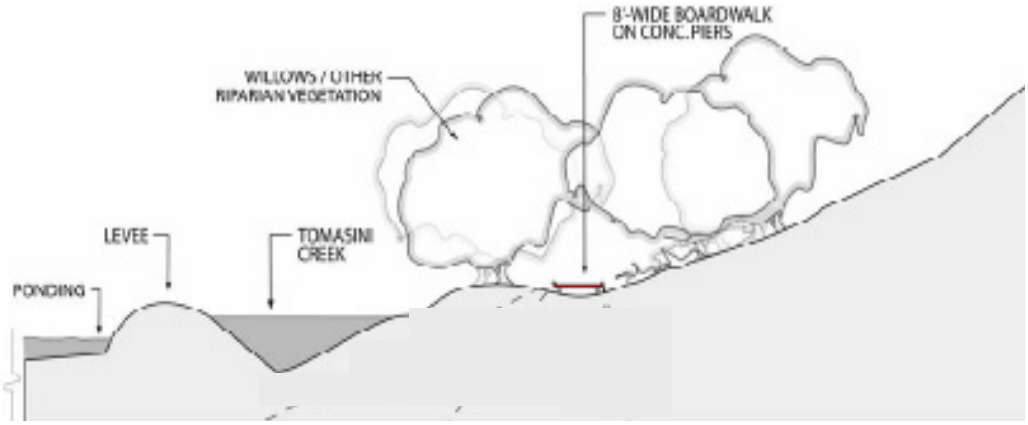


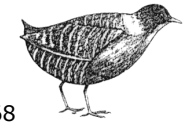
FIGURE 13. EXAMPLE OF LOW-ELEVATION BOARDWALK TRAIL ON EASTERN PERIMETER OF TOMASINI CREEK

- ***Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 12)***: A total of four (4) viewing areas, overlooks, and interpretative exhibits would be constructed along the perimeter of the Project Area. Three of these would be identical to those described under Alternative A. A fourth viewing area would be added along Sir Francis Drake Boulevard near the entrance to the West Pasture north levee, which would be removed under Alternative B. This viewing area would potentially be constructed as a blind to minimize disruption to avian species that use this portion of the Project Area.

Construction

- ***Construction Scheduling***: For Alternative B, restoration would be conducted in two years. Since release of the DEIS/EIR, construction schedules have changed in terms of the order in which components would be constructed during certain seasons. The first construction season would be conducted during approximately a 90-day period from August through October 31. The second construction season would be conducted during approximately a 180-day period from May 1 through October 31. During the second construction year, construction would be staggered such that components in the southern end of the Project Area would be initiated first to ensure that construction activities do not disturb special status rail populations that occur in the undiked marsh north of the Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1 of each year, and there are regulations prohibiting timing of construction between March 1 and August 15 and proximity of construction to active nests during the breeding season for other birds, as well. Depending on when funding is obtained, public access alignments and infrastructure would be constructed either during or after restoration. It is anticipated that construction of public access would take an additional two construction years. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only authorization by the Seashore and CSLC.

- ***General Description of Construction-Equipment and Water Control Measures:*** Construction equipment that would be expected to be used in construction are identical to those described under



Alternative A and include, but are not limited to, excavators, front loaders, backhoes, bulldozers, graders, dump trucks, and water trucks: some of this equipment may need to be specialized for use in muddy or aquatic areas due to the shallow groundwater table.

During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough, removal of tidegate/culverts on Fish Hatchery Creek in the West Pasture, and removal of riprap and bank stabilization in the riprapped area along the southern portion of the East Pasture.

- ***General Description of Construction-Equipment- Access, Staging, Stockpiling, Traffic Control, and Trail Closures:*** Under Alternative B, construction activities would occur in the East and West Pastures (Figures 11 and 12). Construction access to and equipment staging for the East Pasture would be the same as described under Alternative A. Construction equipment would access the West Pasture from potentially three locations: 1) the very southern end; 2) directly north of the Gradjanski residence across from the commercial area in Inverness Park; and 3) the very northern end at the north levee. Equipment would most likely be staged near the Giacomini Hunt Lodge and in the East and West Pastures, probably near the access road entrances.

  Any stockpiling of excavated sediments would occur in the East and West Pastures. Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road (see further description under Total On-Site and Off-Site Disposal below). These same roads would be used for occasional delivery of supplies and materials, such as for erosion control materials, water diversion, and fuel, as well as for refilling of the water truck (~ three to five times per day).

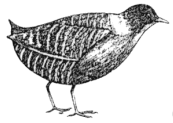
  Traffic control measures that may be required would be identical to those described under Alternative A, although construction in the West Pasture may require additional measures on Sir Francis Drake Boulevard. Traffic flow on Sir Francis Drake Boulevard adjacent to the West Pasture may be impacted intermittently during large equipment delivery (e.g. large excavators, bulldozers, etc.) in order to provide adequate turning radius/access into the West Pasture. This traffic interference might require limiting vehicle passage to a single lane over a distance up to 0.1 miles or stopping traffic in both directions for a short period of time (no more than 5 minutes). Proper signage and flagging would be provided during all traffic disruptions. Traffic control measures may also be required during hauling of excavated sediments. Potential measures that might be employed range from signage (e.g. speed limit controls, caution on trucks entering roadway) to flagging, and one of these measures would be provided at any of the three West Pasture access locations being used during hauling to ensure vehicle safety while trucks are entering and exiting the West Pasture.

  Construction of the restoration and/or public access components could cause temporary closure of the informal trail on the southern perimeter of the East Pasture and permanent closure of the informal trail on the northern perimeter of the West Pasture (north levee).

- ***Total Cut/Fill***: Actions proposed under Alternative B would result in excavation of approximately 145,000 cubic yards of soil and 850 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of 45,000 cubic yards of soil (Figure 9). Fill would involve re-use of excavated sediments on-site for filling drainage ditches, the manure ponds at the Dairy Facility, and other restoration and public access components. The fill total assumes that, for most of the public access components, fill activities would be negligible and restricted to minor grading activities.

- ***Total On-Site and Off-Site Disposal***: To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative B total approximately 72,500 and 72,600 cubic yards of soil, respectively (Figure 9). In addition, excavated non-soil materials totaling approximately 850 cubic yards would also be recycled or need to be disposed of off-site.

  Soils removed off-site would be hauled to several defunct quarries in the Tomales Point portion of the Seashore that the Park Service is actively trying to restore as described under Alternative A.



Excavated sediment under this alternative would be used to restore the Grossi, Evans, McClure DG, and Evans-Abbotts quarries (Figure 10). Sediments would be hauled to these quarries using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, a pasture to reach quarries. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

Alternative C – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access

This alternative involves complete removal of levees in both the West and East Pasture. In general, this alternative builds upon the actions proposed in Alternative B by increasing tidal channel creation, grading, and revegetation (Figure 14, Table 1). In addition, the project boundary for this alternative has been expanded to include Olema Marsh, which is located south of the Giacomini Ranch and White House Pool and is owned by ACR and the Park Service (Figure 14). Olema Marsh and the Giacomini Ranch once formed an integrated tidal wetland complex. In Alternative C, the Bear Valley creek channel that flows through the Olema Marsh would be excavated to allow for better passage of salmon and other fish species (Figure 14). In addition, an adaptive restoration approach is proposed that would possibly include future replacement of the Levee Road and Bear Valley Roads culvert should initial restoration efforts not achieve the desired degree of hydrologic connectivity between Olema Marsh and Lagunitas Creek. Public access components of Alternative C include the southern perimeter path and proposed future trails as described under Alternatives A and B, but there would be two spur trails rather than a through-trail on the eastern perimeter of the Giacomini Ranch (Figure 15, Table 1).

Alternative C was formerly the agency-preferred alternative in the DEIS/EIR, but, based on public and agency comment, the Seashore and CSLC have selected Alternative D as the preferred alternative in the FEIS/EIR. A more detailed discussion of this change can be found in the discussion of the Preferred Alternative later in this chapter.

Restoration

East Pasture

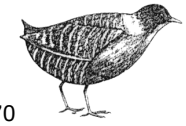
- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure Short-Term, Eliminate Road Through Regrading)***: Activities conducted under Alternative C would be identical to that described under Alternatives A and B.

- ***Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation)***: Activities conducted under Alternative C would be identical to that described under Alternative A.

- ***Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Remove Invasive Species, Conduct Revegetation)***: Activities conducted under Alternative C would be identical to that described under Alternative B.

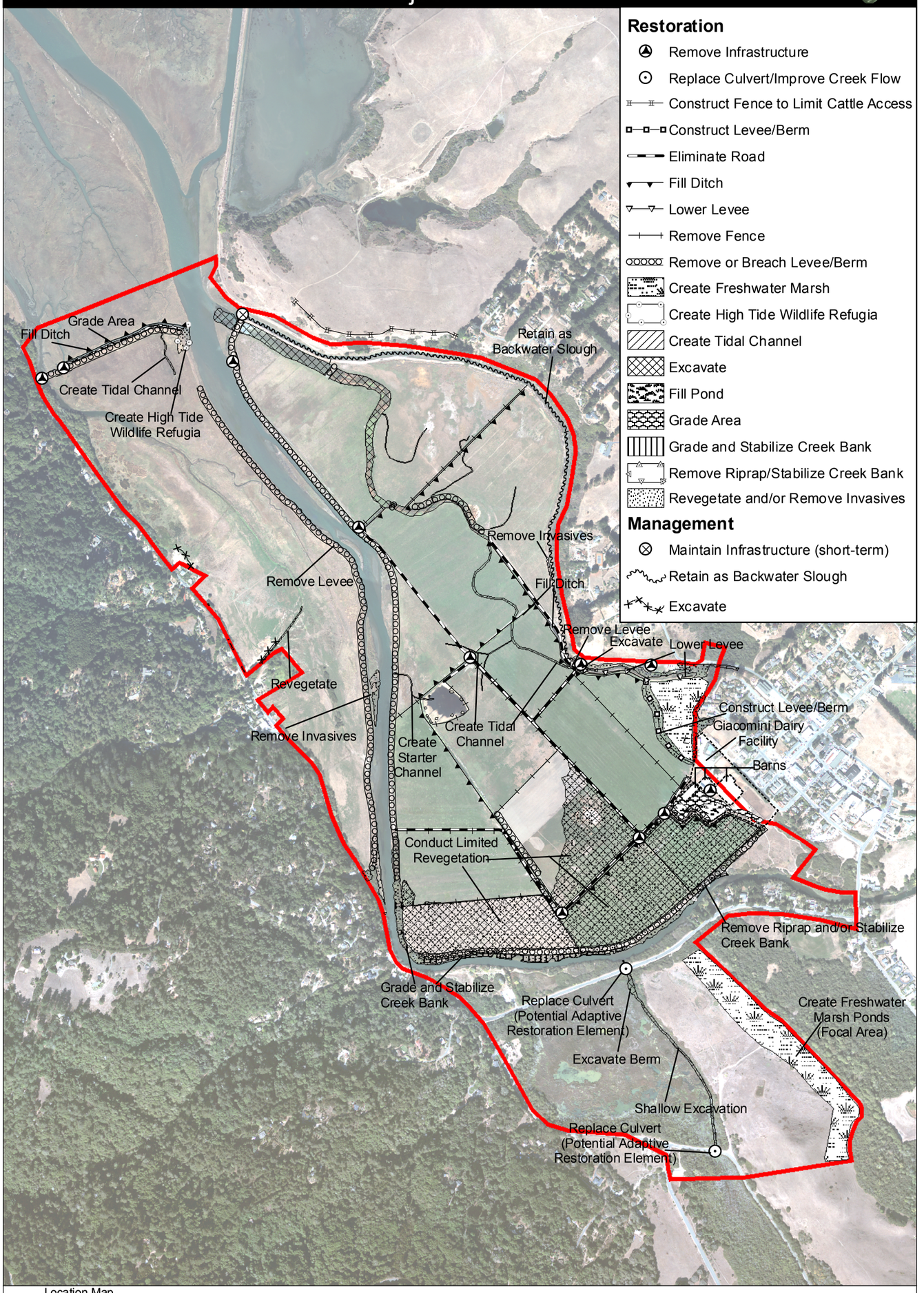
- ***Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee)***: Activities conducted under Alternative C would be identical to that described under Alternative B.

- ***Complete Removal of Levee in East Pasture (Remove or Breach Levee)***: Activities conducted under Alternative C would be identical to that described under Alternative B.



Alternative C - Restoration and Management

Giacomini Wetland Restoration Project



Location Map

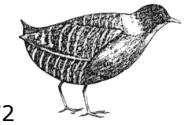
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

0 0.25 0.5 0.75 1 Miles

Figure 14

Intentionally Left Blank



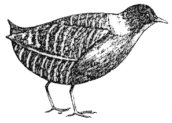
- ***Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment (Remove or Breach Levee, Excavate; Figure 14)***: Under Alternative C, a section of the levee that separates Tomasini Creek from the East Pasture would be removed rather than lowered as under Alternative B to allow for reconnection of Tomasini Creek with one of its historic channel alignments. Approximately 60 linear feet of levee near the Giacomini Hunt Lodge would be removed. Once the section of berm is removed, a 220-foot connection channel would be excavated between the existing Tomasini Creek channel and the created tidal channel in the historic slough within the East Pasture marshplain. The current or existing Tomasini Creek channel would be left as is and allowed to function as a backwater slough, with tidal flow and spring and seep groundwater flow as the primary hydrologic sources. The backwater slough channel would be disconnected from Tomasini Creek through construction of a small earthen berm or levee on the north side of the realigned Tomasini Creek, however, the berm would be deliberately constructed to allow for overspill of flood flows during larger storm events. Material for this berm would come from channel excavation, which would generate approximately 360 cubic yards of soil, and removal of the existing Tomasini Creek levee, which would generate approximately 225 cubic yards of soil. The remaining excavated materials would be spread on-site, used to construct the freshwater marsh retention berm, and hauled for off-site disposal.

- ***Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 14)***: In addition to the tidal channel enhancement and creation activities under Alternatives A and B, approximately 1,200 feet of new tidal channel would also be excavated in the central portion of the restored East Pasture. The headwaters or starting point of the new tidal channels would be just east of the New Duck Pond and would drain to the realigned Tomasini Creek, connecting just north of the Giacomini Hunt Lodge. Excavation would generate approximately 250 cubic yards of soil, and some of these excavated materials would be spread on-site or used as block or plug material for filling of drainage ditches because of the high clay content. As with the other channels, efforts would be made to recreate some of the curves or sinuosity that was once present in the historic tidal sloughs before they were artificially straightened to act as drainage ditches. Overall, construction and deepening of existing sloughs would be designed to create a balance in water residence time such that ponded areas are retained during low tide for aquatic species such as tidewater goby, but flushing occurs regularly enough that water quality and intertidal mudflat conditions are maximized.

Alternative C involves complete removal of levees in both the West and East Pasture. The project boundary for this alternative has been expanded to include Olema Marsh.

- ***Creation of New Lagunitas Creek Tidal Channel (Create Tidal Channel; Figure 14)***: In addition to the tidal channels draining to the realigned Tomasini Creek, a so-called "starter" channel would be constructed in the southern end of the East Pasture on the west side of the New Duck Pond to allow for creation of a tidal channel that would drain to Lagunitas Creek. The starter channel would be located roughly in the same alignment as a historic slough that roughly overlay the San Andreas Fault trace. Length of the starter channel would total approximately 550 feet. The channel bottom elevations at the end of the starter channel would be slightly lower in elevation than other portions of the channel bottom to allow for residual ponding of waters for aquatic species that may use this type of off-channel habitat. Excavation would generate approximately 200 cubic yards of soil and would be disposed of through spreading on-site, use as block or plug for filling of drainage ditches, and hauling to off-site disposal.

- ***Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle (Create Freshwater Marsh, Create Low Freshwater Marsh Berm)***: Activities conducted under Alternative C would be identical to that described under Alternative B.



- ***Installation of Fencing on Martinelli Ranch (Construct Fence to Limit Cattle Access)***: Activities conducted under Alternative C would be identical to that described under Alternative B.

- ***Scraping of Southern Portion of East Pasture to Remove Non-Native Species (Excavate; Figure 14)***: Under Alternative C, the southern approximately 40 acres in the East Pasture that are above intertidal elevations would be scraped approximately 6 to 12 inches to remove a large portion of the roots, seed bank, and other vegetative material in two pastures which is dominated by non-native grasses and herbs. Scraping would generate approximately 32,500 cubic yards of soil, all of which would be disposed off-site due to the substantial amount of weedy material in the soils.

- ***Removal of Invasive Species (Remove Invasive Species; Figure 14)***: As described under the previous action alternatives, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. These species include invasive cordgrass and cordgrass hybrids, cape ivy, pampas grass, Himalayan blackberry, and English ivy. Removal efforts for these species are described under the No Action Alternative and Alternatives A and B. Under Alternative C, removal efforts for Himalayan blackberry would be expanded in the East Pasture.

    - ***Himalayan blackberry***: In addition to the areas treated under Alternative B, the Park Service and CSLC would remove Himalayan blackberry from approximately 1.5 acres of riparian habitat along Tomasini Creek adjacent to the old railroad grade and Mesa Road. Total acreage of Himalayan blackberry removal under Alternative C totals up to 10.5 acres. Depending on the location, Himalayan blackberry would be removed using either mechanized equipment to excavate the above- and below-ground portions of the shrub or, particularly on hillsides or areas with sensitive biological resources, manual labor to cut down aboveground portions of plants and dig out the rootball. Monitoring and follow-up treatments, if necessary, would be conducted to ensure that removal efforts have been successful.

- ***Revegetation in East Pasture (Conduct Revegetation; Figure 14)***: Active revegetation under Alternative C would be identical to that described under Alternatives A and B, with the exception of the very southern portion of the East Pasture. The southern approximately 40 acres would first be scraped 6- to 12 inches to remove a substantial portion of the roots, seed bank, and other plant material in the soils. Because this area is naturally above intertidal elevations, this area is likely to develop into an upland ecotone that could be used for wildlife species during high tides. To ensure establishment of some native vegetation, clusters of wildrye would be installed through container plantings or other means, however, because of the size of this area, planting density would be relatively sparse (10' centers). However, wildrye spreads primarily through expansion of belowground stem systems, not seed. Coyote brush would be planted on the perimeters.

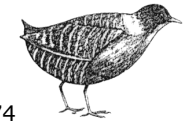
West Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence)***: Activities conducted under Alternative C would be identical to that described under Alternative B.

- ***Complete Removal of Levee in West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch; Figure 14)***: Under Alternative C, the entire approximately 7,200 linear feet of levee would be removed from the West Pasture. The levees would be excavated to the adjacent pasture elevations. The top 2 feet of excavated material, which contains most of the weedy material, would be disposed off-site, while the bottom 2- to 3-feet would be disposed of on-site through spreading.

  Filling of the borrow ditch north of the Giacomini Ranch West Pasture and associated activities would be conducted identical to as described under Alternative B.

- ***Creation of New Tidal Channels (Create Tidal Channel)***: Activities conducted under Alternative C would be identical to that described under Alternative B.



- ***Removal of Invasive Species (Remove Invasive Species; Figure 14)***: Activities conducted under Alternative C would be identical to that described under Alternative B.

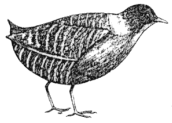
- ***Revegetation in West Pasture (Conduct Revegetation; Figure 14)***: Active revegetation in the West Pasture under Alternative C would be conducted identical to that described under Alternative B, except that revegetation would also be performed on the southern bank of Lagunitas Creek. Approximately 0.7 acres of riparian revegetation would be conducted along this southern portion of Lagunitas Creek, tying into existing low-elevation floodplain riparian habitat south of the Giacomini Ranch. Plant species installed would consist of many of the same plant species that would be planted – or that already occur – on the East Pasture Lagunitas Creek bank. These species include arroyo willow, red alder, with perhaps a few Oregon ash and box elder. Understory species in this area would likely to be dominated by herbs that would recruit naturally without active revegetation.

Olema Marsh

- ***Implement Adaptive Restoration in Olema Marsh****:* As noted earlier, in Alternative C, the project boundary has been expanded to include Olema Marsh, which is owned by the Park Service and Audubon Canyon Ranch (Figure 14). The Park Service, CSLC, and Audubon Canyon Ranch are proposing to implement an adaptive restoration approach that would involve sequential phasing of potential construction components, with more intensive construction components implemented only if the desired degree of restoration success is not achieved through initial measures. The determination of success would be based on the degree to which natural hydrologic and ecological processes and functions have been restored, given that full or extensive restoration would be constrained by a number of factors in this system. These constraints include Levee Road; Bear Valley Road; potential effects on salinity intrusion into local groundwater wells; and potential effects on salmonids in Bear Valley Creek, which flows through the marsh. Should this alternative be implemented, a detailed adaptive restoration program would be prepared that would specify how adaptive management decisions would be made and what measurable criteria would be used to determine whether further restoration actions are necessary. Under this approach, the initial restoration component would be excavation in and alongside Bear Valley Creek in Olema Marsh to decrease impoundment of waters and allow for better passage of salmon and other fish species. Should this action not achieve the desired level of success, future restoration actions would include replacement of the Levee Road and/or Bear Valley Roads culverts. These adaptive restoration actions are described in more detail below.

- ***Pre-Adaptive Restoration Component – Olema Marsh-Olema Creek Frog Habitat Creation***: Several seasonally flooded ponds would be created on the west side of Olema Creek less than 0.5 miles from Olema Marsh to offset potential short- and long-term impacts to California red-legged frog breeding habitat in Olema Marsh. The lower reaches of the Olema Creek watershed just above its confluence with Lagunitas Creek recently began supporting breeding red-legged frogs after the creek reestablished connectivity with its historic eastern floodplains and converted pasture to a complex marsh system with both permanently and seasonally flooded habitats. Several years prior to implementation of restoration in Olema Marsh, ponds totaling approximately up to 2 acres would be excavated on the west side of Olema Creek. (The final size of the ponds would be dependent on consultation with USFWS and site and hydrologic constraints.) The construction approach to these ponds would either attempt to create ponds linked to the local groundwater table or create perched surface water systems that would be built using methods somewhat similar to that described for the created freshwater marsh in the Tomasini Triangle (Alternative B) such as stockpiling excavated topsoil and mixing topsoil with a material such as bentonite to ensure that ponds retain at least some areas of inundation through July or August. The pond bottom would be excavated to create varying water depths that would support emergent and open water habitats.

- ***Adaptive Restoration Component #1***: ***Excavate Vegetated Earthen Berm and Create More Defined Flow Path for Bear Valley Creek (Excavate; Figure 14):*** Under Alternative C, the Park Service and CSLC would expand the Project Area boundary to include restoration of Olema Marsh. To improve hydraulic connectivity and access for salmonids, an approximately 0.2-acre earthen berm that is vegetated currently with riparian vegetation at the northern end of Bear Valley just upstream of Levee Road would be excavated approximately 3 feet. This berm, which is probably a remnant of past fill events, appears to be reducing outflow of the creek and causing impounding of water within the



marsh. In addition, shallow excavation (~ 2 feet) would be performed in a 20-foot corridor along the entire length of Bear Valley Creek in Olema Marsh (approximately 1,650 linear feet) to improve flow and hydraulic connectivity in this section of Bear Valley Creek and potentially improve passage conditions for salmonids. Excavation of the berm and creek would generate approximately 3,650 cubic yards of soil, the majority of which would be sidecast back into the marsh. The material would be sidecast so as to create a low earthen berm between Bear Valley Creek and other portions of Olema Marsh. Approximately 1,200 cubic yards of soil would be disposed of off-site.

- ***Adaptive Restoration Components #2 and/or 3***: ***Potential Future Replacement of Levee Road and/or Bear Valley Culvert with Small Causeway, Bridge, Larger Culvert, or Series of Large Culverts as part of Adaptive Restoration Approach (Proposed Future Culvert Replacement, Proposed Future Excavation; Figure 14)***: Under Alternative C, the Park Service, CSLC, and ACR would potentially work with the County of Marin to adopt an adaptive restoration approach to Olema Marsh. Levee (the portion of Sir Francis Drake Boulevard that runs across the northern portion of the marsh) and Bear Valley Roads are county-owned and maintained roads. Excavation of the vegetated earthen berm and flow path would occur during the initial construction period. In the three to five years after excavation is completed, response of Olema Marsh to completed restoration actions would be evaluated in conjunction with the ACR and the County of Marin. Should the desired degree of restoration success not be achieved in terms of improving hydraulic connectivity between Olema Marsh and Lagunitas Creek and lowering water levels within the marsh, the Park Service, CSLC, and ACR would pursue working with the County of Marin on implementing one or both of two adaptive restoration components or actions.
  The first potential adaptive restoration component is to replace the existing box culvert at the eastern outlet of Bear Valley Creek under Levee Road with up to a 75-foot-long by 50-foot-wide structure. Originally, a 50-foot–long by 30-foot-wide bridge was proposed. However, geotechnical and engineering studies completed during public review of the Draft EIS/EIR indicate that the extremely close proximity to the San Andreas Fault Zone and underlying soft sediments significantly impede the construction of a bridge or causeway at this location. In order to provide a larger opening for improved hydraulic connectivity and avoid the potential impacts of seismic activity and differential settlement on bridge footings and abutments, a series of large concrete box culverts are now being proposed. The design would consist of four 12-foot wide box culverts positioned side-by-side, creating an approximately 48-foot long opening. The eastern-most box culvert would be positioned at the existing culvert location and would be 10-feet high. This culvert would accommodate the Bear Valley Creek low-flow channel and the existing channel at Levee Road would be excavated down to an elevation of 0.0-feet to accommodate the new culvert, approximately 3.5-feet deeper than the existing culvert invert elevation. This 10-foot high culvert would then be embedded creating a natural substrate channel bed at 2.0-feet in elevation. The remaining three box culverts would be 8-feet high and positioned to the west of the 10-foot high culvert. The base of these culverts would be installed at an elevation of 2.0-feet and backfilled with natural substrate material, embedding these culverts to an elevation up to 3.5-feet.

Olema Marsh

  The Bear Valley Creek channel bed would also be lowered to the 2.0-foot elevation. The outboard channel between the new crossing and Lagunitas Creek would also be widened by up to 50-feet to existing outboard channel bed elevations. Excavation of the outboard channel would require replacement of the existing wooden footbridge over the existing Bear Valley Creek in White House Pool County Park with a pedestrian causeway component that would be integrated into the road causeway. Regardless of crossing type, the structure would be wide enough to accommodate a combined 5-foot road offset and 8-foot trail offset along the north side of Levee Road. Excavation of Levee Road berm and the creek channel connecting Olema Marsh to Lagunitas Creek would generate approximately 580 and 1,100 cubic yards of soil, respectively. This material would be disposed of primarily off-site.

The second potential adaptive restoration action or component is replacement of Bear Valley Road culvert on the south end of Olema Marsh. The culvert would be replaced either simultaneously or after the Levee Road culvert has been replaced. Should the desired degree of restoration success not be achieved in terms of improving hydraulic connectivity between Olema Marsh and Lagunitas Creek, increasing fish passage potential, and lowering water levels within the marsh, the Park Service, CSLC, and ACR would pursue replacing the two existing 6-foot culverts on Bear Valley Road with a new structure up to 50-feet–long by 65-feet-wide. A bridge was originally conceived as the preferred replacement crossing type at this location. However, similar to the Levee Road site, continued geotechnical and engineering studies suggest that a bridge is not the optimal structure due to the close proximity to an active fault trace and underlying soft sediments. A more feasible crossing design for improving hydraulic connectivity is the installation of a single enclosed pipe-arch culvert, approximately 13-feet tall by 21.5-feet wide. The bottom of the pipe-arch would be installed at an elevation of 1.2-feet and embedded with natural channel bed material to an elevation of 2.2-feet. The created channel bed would be at an elevation approximately 0.1- to 1.8-feet deeper than the existing culvert inverts. In addition, shallow excavation (~2 feet) of the Bear Valley Creek channel upstream of Bear Valley Road would be conducted in a 20-foot-wide corridor extending approximately 300 feet upstream to improve hydraulic connectivity and passage of flows and salmonids. Excavation of Bear Valley Road berm and creek channel would generate approximately 400 and 445 cubic yards of soil, respectively. Approximately two-thirds of this material would be sidecast during excavation, but the approximately 400 cubic yards from road berm excavation would be disposed of off-site. Similar to Levee Road, the crossing would be wide enough to accommodate a combined 5-foot road offset and 8-foot trail offset along the northeast side of Bear Valley Road.

Management

- ***No Agricultural Land Management***: Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.

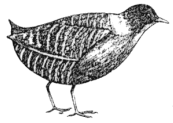
- ***Removal of Main Dairy Structures from Upland Areas***: Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the Park Service property, including the area east of the Giacomini Hunt Lodge, will be demolished and removed from the premises as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek***: Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacominis will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.

- ***Minimal Maintenance and Maintenance of Existing Property Access Points***: Park Service personnel would need to perform maintenance in certain areas either on a regular or occasional basis and would continue to use existing access points where feasible such as 3rd and C Street and Mesa Road entrances in Point Reyes Station and existing access points for West Pasture in Inverness Park.

- ***Tidegates Maintained (Maintain Infrastructure-Short-Term; Figure 14)***: Maintenance of the Tomasini Creek tidegate would be continued under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure under Alternative A for more detailed discussion).

- ***Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate)***: Excess sediment would be removed from the 1906 Drainage and Fish Hatchery Creek on an as-needed basis (annually during average to wet years) as described under the No Action Alternative, including Actions Common to All Alternatives.



- ***Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses***: As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Recover the Tomales Bay Tidewater Goby Population***: Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Lease Subtidal and Intertidal Portions of Lagunitas Creek within Project Area from CSLC***: The Park Service would lease subtidal and intertidal portions of Lagunitas Creek within the Project Area from the CSLC, which currently owns these lands, as well as subtidal and intertidal lands north of the Giacomini Ranch. The northern boundary of the lease would be the Giacomini Ranch north levee and the northern extent of Park Service ownership. The southern boundary would be just north of the Green Bridge.

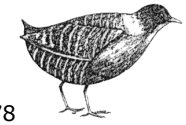
Public Access

- ***Creation of Southern Perimeter Trail from Point Reyes Station to existing White House Pool County park via a permanent pedestrian/bike bridge near the location of the old summer dam (Construct New Improved Trail-Decomposed Granite, Construct Bridge, Construct Fence)***: Under Alternative C, the southern perimeter path would connect to an improved access point at the entrance to the Green Bridge County park trail near the Green Bridge rather than connecting to C Street (Figure 15). C Street access would be maintained for administrative purposes only. The alignment of the path to viewing areas and interpretative facilities on the Dairy Mesa would remain, as well as the alignment of the path connecting to the constructed bridge, but the connection to Point Reyes Station would occur along State Route 1 rather than C Street. The existing steep entrance to the Green Bridge County Park along State Route 1 would be improved to allow easier access by flattening the grade with a bermed trail component or stairs. The trail would be improved and maintained either as an improved earthen trail or through application of some type of surfacing component such as decomposed granite. It would not be paved. The ADA-compliant trail would be moved to the spur trail on the eastern perimeter originating from Mesa Road. Because of the potential for flooding during large storm events, use of this path would be weather-dependent. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Because the Southern Perimeter spur trail is connected to the Green Bridge County park, which currently allows dogs, dogs on leash would continue to be allowed on the Southern Perimeter through- and spur-trail components. However, if at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the area could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1).

- ***Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County (Construct Proposed Future Trail, Construct Proposed Future Trail Alternative-Boardwalk, Construct Proposed Future Trail-ADA Compliant)***: The Park Service would potentially collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park as described under Alternative A.

- ***Potential Replacement of Existing Wooden Footbridge over Bear Valley Creek in Olema Marsh with Pedestrian Causeway Integrated into Levee Road Causeway***: Should future restoration actions in Olema Marsh include replacement of the Levee Road culvert and excavation of the Bear Valley Creek channel connecting Olema Marsh to Lagunitas Creek, the existing wooden footbridge on the east side of White House Pool County park would be replaced, potentially with a pedestrian causeway component that would be integrated into the road causeway.

- ***Creation of Eastern Perimeter Spur Trails through Extension of Tomales Bay Trail and Mesa Road (Construct New Unimproved Trail, Construct New Improved Trail-Soil; Construct***



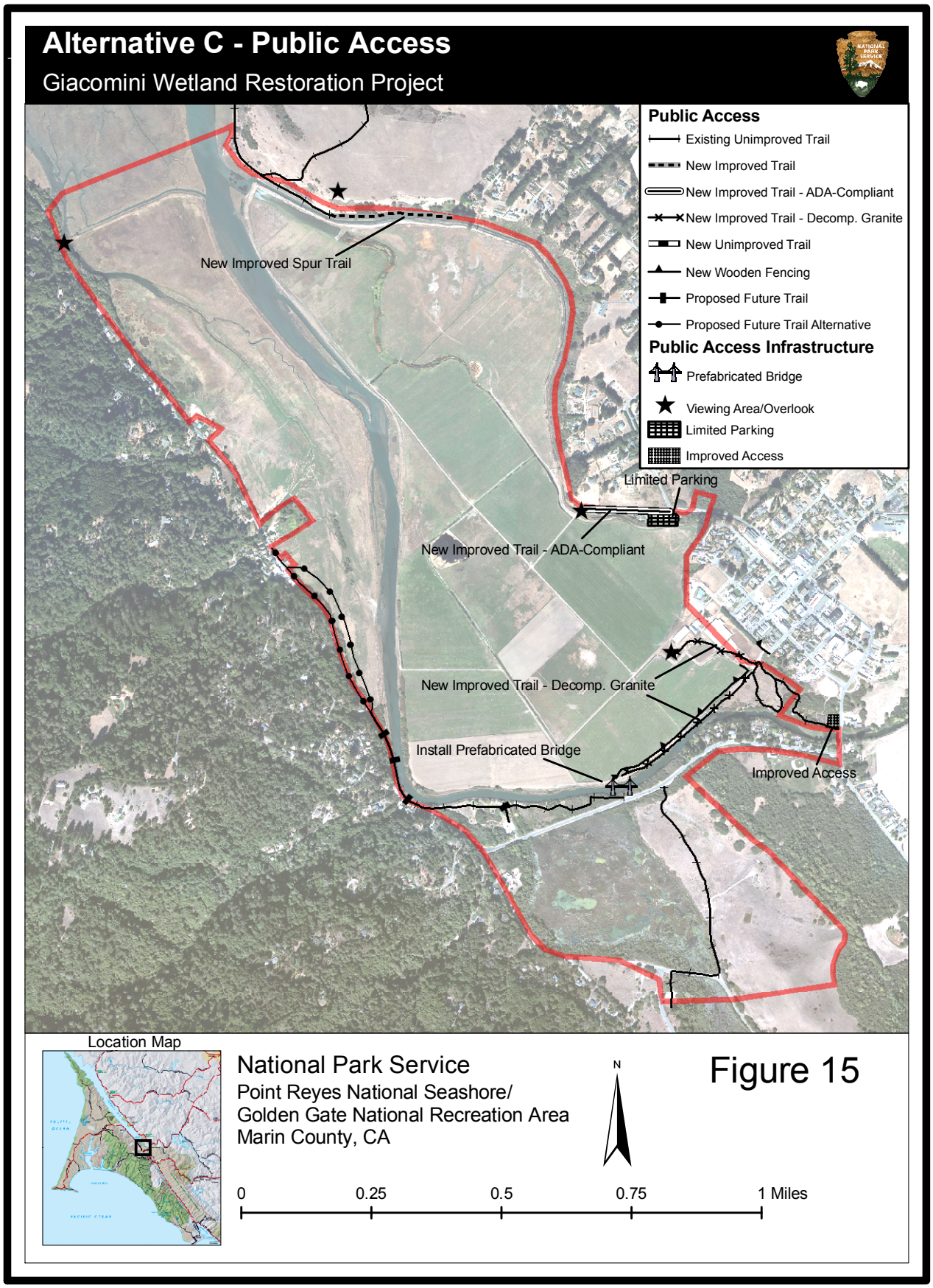

Alternative C - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Trail
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
New Unimproved Trail
New Wooden Fencing
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Prefabricated Bridge
Viewing Area/Overlook
Limited Parking
Improved Access
New Improved Spur Trail
Limited Parking
New Improved Trail - ADA-Compliant
New Improved Trail - Decomp. Granite
Install Prefabricated Bridge
Improved Access
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 15

Proposed Future Trail-ADA Compliant; Figure 15): Unlike Alternatives A and B, public access along the eastern perimeter would be constructed as two spur trails. One would originate from the existing Tomales Bay Trail and would extend southward on the historic railroad grade approximately 1,700 feet. This TBT spur trail, which would be an improved soil, weather-dependent trail, would involve some minor improvements and would be constructed as described under Alternative A. It would allow better viewing of the shallow shorebird area in the eastern portion of the East Pasture. The other spur trail would originate from Mesa Road and would extend along the current road that ends at the Giacomini Hunt Lodge and the proposed viewing area. It would be constructed as an ADA-compliant trail with improvement of the existing road through grading and installation of decomposed granite or other surfacing material that complies with ADA standards. There would continue to be parking for approximately five (5) cars at the corner of the railroad grade and Mesa Road in an existing gravel lot that is currently used for storage of gardening vehicles and equipment. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Dogs would not be allowed in any areas that are not currently open to the public or where dogs are not currently allowed, which includes the Eastern Perimeter spur-trail components. Dogs are currently not allowed on the Tomales Bay Trail, which would connects to the northernmost Eastern Perimeter spur-trail.

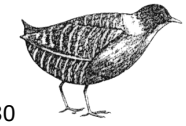
- ***ADA-Compliant Access (Construct Proposed Future Trail-ADA Compliant; Figure 15)***: The ADA-compliant trail would be moved to the spur trail on the eastern perimeter originating from Mesa Road. It would be constructed as a decomposed granite trail compliant with the Americans with Disabilities Act that would extend from a small existing gravel parking lot near Mesa Road to the Giacomini Hunt Lodge and proposed viewing area, which is intended to allow the public to experience and enjoy the restoration project (see Viewing Areas and Exhibits). This portion of the trail would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. The trail would be constructed to ensure that the grade and surfacing is compliant with standards regarding access for people with disabilities such as those established by the Access Board for Outdoor Recreational Facilities. There would still be a potential for construction of an ADA-compliant elevated overlook and path as part of the Southern Perimeter Trail if this trail is extended to Inverness Park as part of a possible future collaborative project with the County of Marin.

- ***Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure)***: A total of four (4) viewing areas, overlooks, and interpretative exhibits would be constructed along the perimeter of the Project Area as described under Alternative B.

Construction

- ***Construction Scheduling***: For Alternative C, restoration would be conducted in two construction years as described under Alternative B. Since release of the DEIS/EIR, construction schedules have changed in terms of the order in which components would be constructed during certain seasons. The first construction season would be conducted during approximately a 90-day period from August through October 31. The second construction season would be conducted during approximately a 210-day period from April 1 through October 31. During the second construction year, construction would be staggered such that components in the southern end of the Project Area would be initiated first to ensure that construction activities do not disturb special status rail populations that occur in the undiked marsh north of the Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1 of each year, and there are regulations prohibiting timing of construction between March 1 and August 15 and proximity of construction to active nests during the breeding season for other birds, as well. Depending on when funding is obtained, public access alignments and infrastructure would be constructed either during or after restoration. It is anticipated that construction of public access would take an additional two construction years. Construction hours would generally be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under authorization by the Seashore and CSLC.

- ***General Description of Construction-Equipment and Water Control Measures:*** The types of construction equipment that would be expected to be used would be very similar to Alternative B, although construction actions in Olema Marsh may require use of pile drivers and specialized equipment such as draglines.



During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough, removal of tidegate/culverts on Fish Hatchery Creek in the West Pasture, removal of riprap and bank stabilization in the riprapped area along the southern portion of the East Pasture, realignment of a portion of Tomasini Creek into one of its historic alignments; and shallow excavation and culvert replacement on Bear Valley Creek.

- ***General Description of Construction-Equipment- Access, Staging, Stockpiling, Traffic Control, and Trail Closures:*** Under Alternative C, construction activities would occur in the East and West Pastures and Olema Marsh (Figures 14 and 15). Construction access to the Giacomini Ranch would be identical to that described for Alternatives A (East Pasture) and B (West Pasture). Olema Marsh construction areas would be accessed from the south end parking lot, as well as directly from Levee Road and Bear Valley Road. Equipment would most likely be staged at the Park Service-owned portions of the dairy ranch facility adjacent to C Street and near the Giacomini Hunt Lodge near Mesa Road, in the East and West Pastures (probably near the access road entrances), and in the Olema Marsh parking lot.

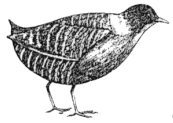
  Any stockpiling of excavated sediments would occur in the East and West Pastures and in upland areas on the east side of Olema Marsh. Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local and connector roadways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, Bear Valley Road, and Pierce Point Road (see further description under Total On-Site and Off-Site Disposal below). These same roads would be used for occasional delivery of supplies and materials, such as for erosion control materials, water diversion, and fuel, as well as for refilling of the water truck (~ three to five times per day).

  Traffic control measures would be largely identical to Alternative B, although inclusion of Olema Marsh may require additional traffic control measures. Traffic control would be needed on Levee and Bear Valley Roads during culvert replacement if the project proponents determine that replacement would be beneficial. The Levee Road culvert may be replaced with either a series of culverts or a bridge, while the Bear Valley Road culverts may be replaced with either a larger single culvert or bridge. Bridge construction would require closure of Levee and Bear Valley Roads for up to three (3) weeks, and vehicles would be re-routed to either Levee Road or Bear Valley Road. Should culverts be installed, vehicle passage on the two roads may be reduced to a single lane over a distance of up to 0.1 miles from one (1) to two (2) weeks, and temporary closure and detour to either Sir Francis Drake or Levee Road may be needed for 1-3 days. In both cases, there may also be occurrences when traffic in both directions is stopped for a short period of time (e.g., 5 to 10 minutes). Signage and flagging will be provided during all traffic disruptions. Traffic control measures to minimize impacts and ensure public safety will be further developed during design.

  Construction of the restoration and/or public access components could cause temporary closure of the informal trail on the southern perimeter of the East Pasture and permanent closure of the informal trail on the northern perimeter of the West Pasture (north levee).

- ***Total Cut/Fill***: Actions proposed under Alternative C would result in excavation of approximately 211,000 cubic yards of soil and more than 940 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 40,000 cubic yards of soil (Figure 6). Total excavation includes the approximately 3,000 and 450 cubic yards of shallow excavation in Olema Marsh and Bear Valley Marshes, respectively, most of which would be sidecast. It also includes approximately 11,000 cubic yards of excavation for mitigation ponds adjacent to Olema Creek, a component that was recently incorporated into the proposed project. Fill would involve re-use of excavated sediments on-site for filling drainage ditches, the manure ponds at the Dairy Facility, and other restoration and public access components. The fill total assumes that, for most of the public access components, fill activities would be negligible and restricted to minor grading activities.

- ***Total On-Site and Off-Site Disposal***: To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site



Disposal for Alternative C total approximately 76,250 and 125,250 cubic yards of soil, respectively (Figure 6). In addition, excavated non-soil materials totaling more than 940 cubic yards would also be recycled or disposed of off-site.

Soils removed off-site would be hauled to several abandoned quarries in the Tomales Point portion of the Seashore as described under Alternative A. Excavated sediment under this alternative would be used to restore the Grossi, Evans, McClure DG, Evans-Abbotts, and McClure Flat quarries (Figure 7). Sediments would be hauled to these quarries using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, a pasture to reach quarries. A separate quarry close-out plan has been developed to ensure structure integrity of fill to the quarries and minimization of weeds from the Project Area being spread elsewhere. Compliance on the quarry close-out plans is being conducted separately, and completion is not required to be completed before disposal takes place. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

Alternative D (Environmentally and Agency Preferred Alternative) – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access

This alternative is very similar to Alternative C with no changes in the West Pasture (Figure 16, Table 1). The very southern end of the East Pasture would be excavated to bring elevations down to intertidal elevations. Tomasini Creek would be fully realigned into one of its historic channel alignments, and the Mesa Road culverts on Tomasini Creek would be replaced to improve hydraulic connectivity, creek flow, and potentially passage of salmonid species. As with Alternative C, there would be an adaptive restoration approach proposed for Olema Marsh that would include a phased approach to shallow channel excavation, vegetated berm removal, and potential replacement of Levee Road and Bear Valley Road culverts in the future should initial restoration efforts not achieve the desired degree of success (Figure 16).

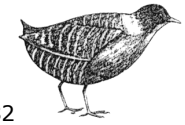
Public access components of Alternative D would include construction of a spur trail to the edge of the Dairy Mesa and an improved spur trail on the southern perimeter following the existing alignment of the informal social path (Figure 17, Table 1). On the eastern perimeter, a spur trail would be created on the historic railroad grade that would extend the existing Tomales Bay Trail (Figure 17). The FEIS/EIR also incorporates a new access component: ADA-compliant access would be provided through improvement of trail facilities and construction of a small viewing platform at White House Pool County park.

Based on public and agency comment during release of the DEIS/EIR, certain elements of the southern perimeter trail system would appear to require further study and analysis and to therefore not be "ripe for decision" by NEPA standards. While Alternative D does not have a non-vehicular bridge across Lagunitas Creek as was proposed under Alternatives A-C, the Park Service would commit to working in the future with the County of Marin on development of additional access facilities on the southern perimeter, including a potential trail on Levee Road and Green Bridge, extension of a trail to Inverness Park, and/or construction of a pedestrian or non-vehicular bridge across Lagunitas Creek at the site of the old summer dam through a separate environmental compliance process.

Restoration

East Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure Short-Term, Eliminate Road Through Regrading)***: Activities conducted under Alternative D would be identical to that described under Alternatives A and B.



Alternative D - Restoration and Management

Giacomini Wetland Restoration Project

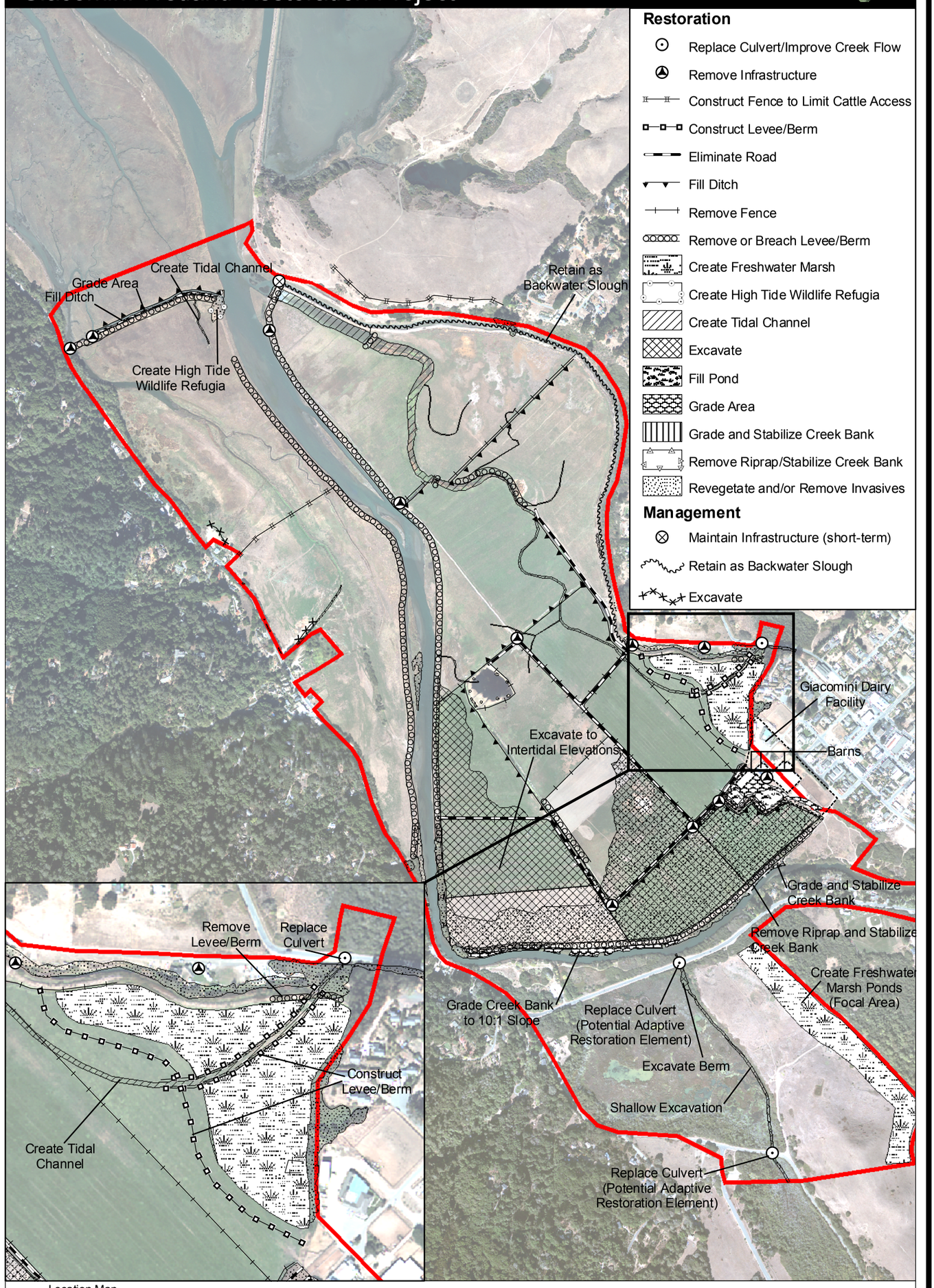
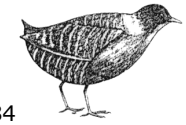


Figure 16

Intentionally Left Blank



- ***Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation)***: Activities conducted under Alternative D would be identical to that described under Alternative A.

- ***Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Remove Invasive Species, Conduct Revegetation)***: Activities conducted under Alternative D would be identical to that described under Alternative B.

- ***Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee)***: Activities conducted under Alternative D would be identical to that described under Alternative B.

- ***Complete Removal of Levee in East Pasture (Remove or Breach Levee)***: Activities conducted under Alternative D would be identical to that described under Alternative B.

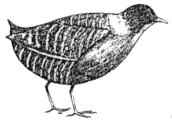
- ***Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment (Remove or Breach Levee, Excavate; Figure 16)***: Under Alternative D, Tomasini Creek would be entirely realigned into one of its historic alignments. Just downstream of Mesa Road, an approximately 150-foot section of levee that separates Tomasini Creek from the East Pasture would be removed rather than lowered as under Alternative B. Approximately 525 linear feet of creek channel would be created through the Tomasini Triangle in the center of the new freshwater marsh. Excavated materials would be sidecast and regarded to create a small berm approximately 2.5 feet above the surrounding marshplain on either side of the new creek channel. The approximately 750-foot berm, which would extend slightly upstream and downstream of the created channel, would preclude drainage of the freshwater marsh into the creek. The berm would be graded to have relatively natural slope topography similar to alluvial levees and would be planted with riparian species. The current or existing Tomasini Creek channel would be left as is and allowed to function as a backwater slough, with tidal flow and spring and seep groundwater flow as the primary hydrologic sources. Channel excavation would generate approximately 3,000 cubic yards of soil, and approximately 275 cubic yards of soil would be excavated in removing the section of the Tomasini Creek berm. In addition to creating the creek berm, excavated materials would be used to construct the freshwater marsh berm, used as fill to block or plug drainage ditches because of the high clay content, and disposed of off-site.

  Alternative D is similar to Alternative C. The very southern end of the East Pasture would be excavated to bring elevations down to intertidal elevations. Tomasini Creek would be fully realigned into one of its historic channel alignments.

- ***Replace Tomasini Creek Culverts at Mesa Road (Replace Infrastructure; Figure 16)***: The two 6-foot culverts at Mesa Road could be replaced with an arched culvert or bridge to improve hydraulic connectivity of upstream and downstream portions of Tomasini Creek and possible increase passage potential for salmonid species. The existing berm and culvert would be removed, totaling approximately 450 cubic yards of soil and 150 of non-soil material. Following more detailed hydraulic analyses, the culvert would be replaced with either an arched culvert or small bridge.

- ***Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 16)***: Activities conducted under Alternative D would be identical to that described under Alternative C.

- ***Creation of New Lagunitas Creek Tidal Channel (Create Tidal Channel; Figure 16)***: Activities conducted under Alternative D would be identical to that described under Alternative C.



- ***Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle (Create Freshwater Marsh, Create Low Freshwater Marsh Berm; Figure 16)***: Activities conducted under Alternative D would be identical to that described under Alternative B, except that the scale of marsh and berm creation would be reduced due to complete realignment of Tomasini Creek into one of its historic alignments. Under Alternative D, the freshwater marsh would be approximately 5.2 acres rather than 5.4 acres as under Alternatives B and C, and the freshwater marsh retention berm would be slightly smaller – approximately 1.6 acres. Approximately 0.2 acres of berm would also be constructed parallel to either side of the realigned Tomasini Creek in the created freshwater marsh to preclude rapid drainage of ponded waters. Otherwise, design and construction of the marsh would be identical to that described under Alternative B.

- ***Installation of Fencing on Martinelli Ranch (Construct Fence to Limit Cattle Access)***: Activities conducted under Alternative D would be identical to that described under Alternative B.

- ***Scraping of Southern Portion of East Pasture to Remove Non-Native Species (Excavate; Figure 16)***: Under Alternative D, the extent of scraping proposed in the southern end of the East Pasture to remove weedy plant species would be reduced from approximately 40 acres to 26.1 acres because of the excavation planned in the southwestern corner (see below). Otherwise, design, construction, and revegetation would be identical to that described under Alternative C.

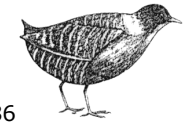
- ***Excavation of Southwestern Portion of East Pasture to Marshplain/Floodplain Elevations (Excavate; Figure 16)***: Currently, the southern portion of the East Pasture is above elevations subject to regular tidal and floodplain processes due to large amounts of sediment deposited by past flooding and past fill and grading activities. Based on public and staff comment, the size of the potential excavation area has been increased slightly up to 32.5 acres, although the exact amount of area that would be excavated would be contingent on receiving the necessary funding for earthmoving and hauling. Should the Park Service and CSLC receive partial funding, the extent of the excavated area would be reduced, with most of the earthmoving activities concentrated in the very southern portions of the East Pasture.

  While the potential areal extent of excavation has been increased in the FEIS/EIR, the grading plan has been altered such that the total amount of soil excavated would remain equivalent to that discussed in the DEIS/EIR, even if the full 32.5 acres were excavated. Excavation would generate approximately up to 59,600 cubic yards of soil, most of which would need to be disposed of off-site. The southwestern portion of the East Pasture where elevations equal or exceed approximately 5 feet NAVD88 would be excavated anywhere from up to 0.5- to 2 feet to create mid-marsh, high-marsh, and floodplain elevations ranging from 4.5- 8 feet NAVD88. Elevations between 10- and 11 feet NAVD88 would be scraped up to 1 foot to eliminate roots, seed banks, and fragments of weedy, non-native species. The excavation area would be graded to mimic natural topography of the East Pasture by creating a gradual downward slope from south to north.

- ***Removal of Invasive Species (Remove Invasive Species)***: As described under the previous action alternatives, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. These species include invasive cordgrass and cordgrass hybrids, cape ivy, pampas grass, Himalayan blackberry, and English ivy. Removal efforts for these species are described under the No Action Alternative and Alternatives A through C. Under Alternative D, invasive species removal efforts would be expanded to include additional removal of Himalayan blackberry.

  - ***Himalayan blackberry***: Approximately up to 0.9 additional acres of Himalayan blackberry would be removed from the Dairy Mesa slope on the south side of the Tomasini Triangle. Under this alternative, Himalayan blackberry removal efforts would total approximately up to 11.4 acres. It would be removed using manual labor to cut down aboveground portions of plants and dig out the rootball. Monitoring and follow-up treatments, if necessary, would be conducted to ensure that removal efforts have been successful.

  - ***Eucalyptus (Eucalyptus globulus)***: Juvenile and mature trees of eucalyptus (*Eucalyptus globulus*) would be removed from up to approximately 0.34 acres of the Tomasini Creek berm and opposite bank, including near the Giacomini Hunt Lodge. There are approximately 27 adults, nine (9) juvenile, and six (6) snags. Eucalyptus would be cut down to the stump, and



the stumps would be covered with black tarp for approximately 1 year. Because most of these areas are subject to flood scour, the tarp would need to be securely fastened to the ground, or some other non-herbicidal means of control may be used.

- ***Revegetation in East Pasture (Conduct Revegetation; Figure 16)***: Active revegetation under Alternative D would be identical to that described under Alternative C, with the exception of the very southern portion of the East Pasture and the Tomasini Triangle freshwater marsh. The limited revegetation effort proposed for the upland ecotone area that would be scraped to remove weedy, non-species would be scaled back from 40.3 to 26.1 acres. Similarly, revegetation in the Tomasini Triangle and the freshwater marsh berm would also be scaled back to account for the fact that the marsh would decrease in size from 5.4 to 5.2 acres, and the berm would decrease from 1.7 to 1.6 acres. These restoration tasks are described in greater detail above. Other than a reduction in scale, the revegetation approach would remain identical to that described under Alternatives C and B, respectively.

  New revegetation components in Alternative D would include planting of high marsh and upland ecotone plant species in up to 9.5 acres of the excavated intertidal marshplain and floodplain area in the southwestern corner of the East Pasture. As with other high marsh/upland ecotone areas, plant species would consist of a mix of container planting and seeding of saltgrass, red fescue, gumplant, western marsh rosemary, and pickleweed. Above intertidal elevations, the excavated area would be planted with wildrye and gumplant. Both saltgrass and wildrye spread primarily through expansion of aboveground or belowground stem systems.

  In addition, some planting would be conducted on the approximately 0.2-acre berm created adjacent to the realigned Tomasini Creek to preclude drainage of the freshwater marsh into the creek. Revegetation would principally involve installation of pole cuttings of arroyo willow and red alder. Other species would be allowed to recruit naturally into the developing riparian habitat.

West Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence)***: Activities conducted under Alternative D would identical to that described under Alternatives B and C.

- ***Complete Removal of Levee in West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch)***: Activities conducted under Alternative D would be identical to that conducted under Alternative C.

- ***Creation of New Tidal Channels (Create Tidal Channel)***: Activities conducted under Alternative D would be identical to that described under Alternative B.

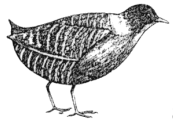
- ***Removal of Invasive Species (Remove Invasive Species)***: As described under the No Action Alternative and Alternatives A and B, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. Removal efforts for invasive species would be identical to that described under Alternative C.

- ***Revegetation in West* Pasture *(Conduct Revegetation)***: Active revegetation in the West Pasture under Alternative D would be conducted identical to that described under Alternative C.

Olema Marsh

- ***Implement Adaptive Restoration in Olema Marsh***: As described under Alternative C, the Park Service, CSLC, and Audubon Canyon Ranch would implement an adaptive restoration approach that would involve sequential phasing of potential construction components, with more intensive construction components implemented only if the desired degree of restoration success is not achieved through initial measures.

- ***Pre-Adaptive Restoration Component -- Olema Marsh-Olema Creek Frog Habitat Creation***: Several seasonally flooded ponds would be created on the west side of Olema Creek less than 0.5



miles from Olema Marsh to offset potential short- and long-term impacts to California red-legged frog breeding habitat in Olema Marsh, as described under Alternative C.

- ***Adaptive Restoration Component #1***: ***Excavate Vegetated Earthen Berm and Create More Defined Flow Path for Bear Valley Creek (Excavate; Figure 16)***: Activities conducted under Alternative D would be identical to that described under Alternative C.

- ***Adaptive Restoration Components #2 and #3***: ***Potential Future Replacement of Levee Road and/or Bear Valley Road Culverts with Small Causeway, Bridge, Larger Culvert, or Series of Large Culverts as part of Adaptive Restoration Approach (Proposed Future Culvert Replacement, Proposed Future Excavation; Figure 16)***: As described under Alternative C, an adaptive restoration approach would be taken with regards to Olema Marsh that would potentially include future replacement of Levee Road/or Bear Valley Road culverts with a different type of structure to improve hydraulic connectivity.

Management

- ***No Agricultural Land Management***: Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Removal of Main Dairy Structures from Upland Areas***: Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the Park Service property, including the area east of the Giacomini Hunt Lodge, will be demolished and removed from the premises.

- ***Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek***: Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacominis will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.

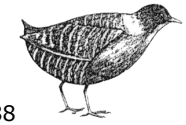
- ***Minimal Maintenance and Maintenance of Existing Property Access Points***: Park Service personnel would need to perform maintenance in certain areas either on a regular or occasional basis and would continue to use existing access points where feasible such as 3rd and C Street and Mesa Road entrances in Point Reyes Station and existing access points for West Pasture in Inverness Park.

- ***Tidegates Maintained (Maintain Infrastructure-Short-Term)***: Maintenance of the Tomasini Creek tidegate would be continued under Alternative A and all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure under Alternative A for more detailed discussion).

- ***Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate)***: Excess sediment would be removed from the 1906 Drainage and Fish Hatchery Creek on an as-needed basis (annually during average to wet years) as described under the No Action Alternative, including Actions Common to All Alternatives

- ***Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses***: As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to an instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Recover the Tomales Bay Tidewater Goby Population***: Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the



Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Lease Subtidal and Intertidal Portions of Lagunitas Creek within Project Area from CSLC***: The Park Service would lease subtidal and intertidal portions of Lagunitas Creek within the Project Area from the CSLC, which currently owns these lands, as well as subtidal and intertidal lands north of the Giacomini Ranch. The northern boundary of the lease would be the Giacomini Ranch north levee, and the southern boundary would be just north of the Green Bridge.

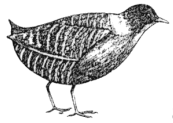
Public Access

- ***Creation of Southern Perimeter Spur Trail from Point Reyes Station to Location of Former Summer Dam and Potential Future Linkage of Trail to South Side of Lagunitas Creek in Collaboration with County (Construct New Improved Trail- ADA-Compliant, Construct New Improved Trail-Decomposed Granite, Construct Fence; Figure 17)***: The southern perimeter path would become a spur trail rather than a connection to White House Pool county park under Alternative D. Otherwise, it would be similar to Alternative C in terms of having the public access entrance formally switched to the Green Bridge, with C Street maintained for administrative access. There would be no ADA-compliant component on this portion of the southern perimeter trail. Because of the potential for flooding during large storm events, use of this path would be weather-dependent. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Because the Southern Perimeter spur trail is connected to the Green Bridge County park, which currently allows dogs, dogs on leash would continue to be allowed on the Southern Perimeter spur-trail components. However, if at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the area could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1).

- ***Potential Future Collaboration with County on Other Southern Perimeter Access Facilities (Construct Proposed Future Trail)***: The trail from Point Reyes Station to the location of the old summer dam would be constructed exactly as described under Alternative A, except that there would be no connection to White House Pool County Park and the Olema Marsh Trail via a permanent pedestrian bridge, at least at the current time. Based on public and agency comment received during release of the DEIS/EIR, many components of the southern perimeter trail system appear to require further study, analysis, and scoping before they can be implemented and are, therefore, not "ripe for decision" by NEPA standards. The Park Service would commit to working with the County of Marin in the future on creation of a southern perimeter trail system that would reevaluate access options, including potential siting of a trail on Levee Road and the Green Bridge, extension of a trail to Inverness Park, and/or construction of a bridge across Lagunitas Creek at the site of the old summer dam as proposed under Alternatives A-C in this document. Implementation of these public access options would require completion of a separate environmental compliance process.

- ***Creation of Eastern Perimeter Spur Trail through Extension of Tomales Bay Trail (Construct New Improved Trail-Soil; Figure 17)***: Unlike Alternative C, public access along the eastern perimeter would be constructed as one rather than two spur trails. The spur trail would originate from the existing Tomales Bay Trail and would extend southward on the historic railroad grade approximately 750 feet. This TBT spur trail, which would be an improved soil, weather-dependent trail, would involve some minor improvements and would be constructed as described under Alternative A. It would allow better viewing of the shallow shorebird area in the eastern portion of the East Pasture. There would be no ADA-compliant component on the eastern perimeter spur trail or small parking area near Mesa Road, because of the elimination of the Mesa Road spur trail. The proposed trail would be open for use by pedestrians, bicyclists, and equestrians. Dogs would not be allowed in any areas that are not currently open to the public or where dogs are not currently allowed, which includes the Eastern Perimeter spur-trail component. Dogs are currently not allowed on the Tomales Bay Trail, which would connect to the Eastern Perimeter spur-trail.

- ***ADA-Compliant Access (Construct ADA-Compliant Trail; Construct Public Access Infrastructure, Figure 17)***: In the FEIS/EIR, ADA-compliant access has been incorporated into Alternative D. ADA-compliant access would be provided through improvement of trail facilities



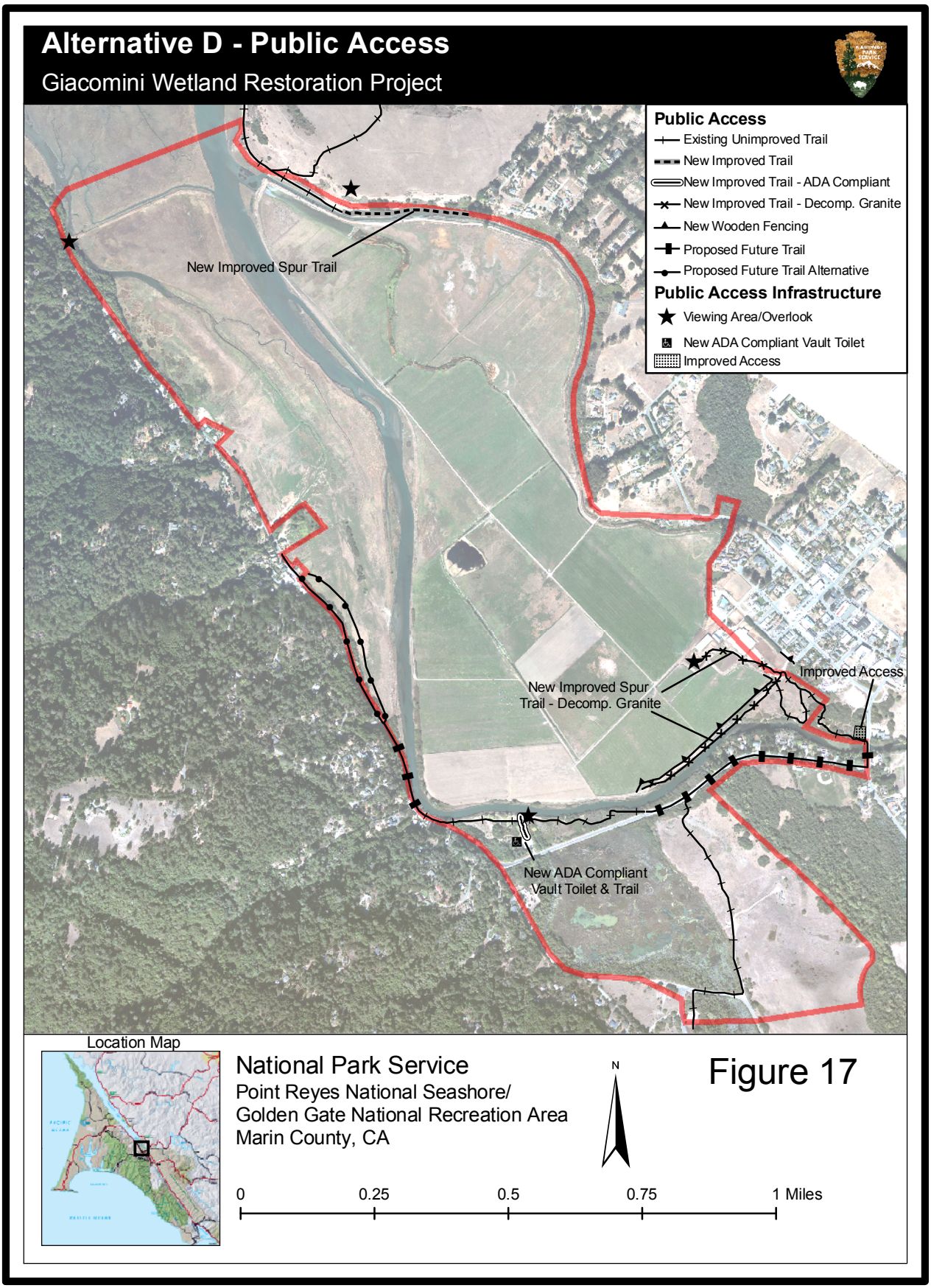

Alternative D - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
New Improved Trail
New Improved Trail - ADA Compliant
New Improved Trail - Decomp. Granite
New Wooden Fencing
Proposed Future Trail
Proposed Future Trail Alternative
Public Access Infrastructure
Viewing Area/Overlook
New ADA Compliant Vault Toilet
Improved Access
New Improved Spur Trail
New Improved Spur Trail - Decomp. Granite
Improved Access
New ADA Compliant Vault Toilet & Trail
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 17

originating from the White House Pool parking lot to Lagunitas Creek and construction of a small viewing platform at White House Pool County park, which is intended to allow the public to experience and enjoy the restoration project (see Viewing Areas and Exhibits). This portion of the trail would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. The trail would be constructed to ensure that the grade and surfacing is compliant with standards regarding access for people with disabilities such as those established by the Access Board for Outdoor Recreational Facilities. As part of this project, the vault toilet facilities would be replaced and upgraded to provide access to those with disabilities, and handicapped parking would be provided in the parking lot.

- ***Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 17)***: A total of four (4) viewing areas, overlooks, and interpretative exhibits would be constructed along the perimeter of the Project Area. The proposed viewing area/overlook near the Giacomini Hunt Lodge would be eliminated, as there would be no spur trail connecting to this area, but a small viewing area would be constructed at White House Pool County park.

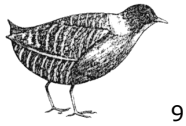
Construction

- ***Construction Scheduling***: For Alternative D, restoration would be conducted in two construction years as described under Alternative C, although it is probable that replacement of the Tomasini Creek culvert at Mesa Road would occur after restoration due to the need to raise additional funds for this component. Since release of the DEIS/EIR, construction schedules have changed in terms of the order in which components would be constructed during certain seasons. The first construction season would be conducted during approximately a 90-day period from August through October 31. The second construction season would be conducted during approximately a 210-day period from April 1 through October 31. During the second construction year, construction would be staggered such that components in the southern end of the Project Area would be initiated first to ensure that construction activities do not disturb special status rail populations that occur in the undiked marsh north of the Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1 of each year, and there are regulations prohibiting timing of construction between March 1 and August 15 and proximity of construction to active nests during the breeding season for other birds, as well. Depending on when funding is obtained, public access alignments and infrastructure would be constructed either during or after restoration. It is anticipated that construction of public access components would take an additional one to two construction years. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under authorization by the Seashore and CSLC.

Salt Marsh Pasture

- ***General Description of Construction-Equipment and Water Control Measures:*** The types of construction equipment that would be expected to be used would be very similar to Alternative C.

  During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough, removal of tidegate/culverts on Fish Hatchery Creek in the West Pasture, removal of riprap and bank stabilization in the riprapped area along the southern portion of the East Pasture, realignment of



Tomasini Creek into one of its historic alignments; shallow excavation and culvert replacement on Bear Valley Creek, and replacement of Tomasini Creek culverts on Mesa Road.

- ***General Description of Construction, including Staging, Stockpiling, Traffic Control Measures, and Public Access Closures***: Under Alternative D, construction activities and staging areas would be very similar to those described under Alternatives A- C. Replacement of the Tomasini Creek Mesa Road culvert would require staging and stockpiling areas close to Mesa Road, probably in the vicinity of the former Worker Housing area. Any stockpiling of excavated sediments would occur in the East and West Pastures and in upland areas on the east side of Olema Marsh.

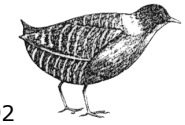
  Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local and connector roadways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, Bear Valley Road, and Pierce Point Road (see further description under Total On-Site and Off-Site Disposal below). These same roads would be used for occasional delivery of supplies and materials, such as for erosion control materials, water diversion, and fuel, as well as for refilling of the water trucks (~ three to five times per day).

  Traffic control measures that may be required would be identical to that described under Alternative C, except for potential road closures associated with replacement of the Mesa Road Tomasini Creek culvert. Replacement of the culvert on Mesa Road would be expected to result in temporary road closures (~3 days) and detouring of residential traffic via State Route 1. Traffic flow would also be reduced to a single lane over a distance of up to 0.1 miles from one (1) to two (2) weeks during installation. Construction of the restoration and/or public access components could cause temporary closure of the informal trail on the southern perimeter of the East Pasture and permanent closure of the informal trail on the northern perimeter of the West Pasture (north levee).

- ***Total Cut/Fill***: Actions proposed under Alternative D would result in excavation of approximately up to 257,000 cubic yards of soil and more than 1,100 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 40,000 cubic yards of soil (Figure 9). The total excavation total would depend on the extent of excavation undertaken in the southern portion of the East Pasture, which is contingent on receiving additional funding. Total excavation includes the approximately 3,000 and 450 cubic yards of shallow excavation in Olema Marsh and Bear Valley Marshes, respectively, most of which would be sidecast. It also includes approximately 11,000 cubic yards of excavation for mitigation ponds adjacent to Olema Creek, a component that was recently incorporated into the proposed project. Fill would involve re-use of excavated sediments on-site for filling drainage ditches, the manure ponds at the Dairy Facility, and other restoration and public access components. The fill total assumes that, for most of the public access components, fill activities would be negligible and restricted to minor grading activities.

- ***Total On-Site and Off-Site Disposal***: To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative D total approximately 76,000 and up to 170,000 cubic yards of soil, respectively (Figure 9). In addition, excavated non-soil materials totaling more than 1,100 cubic yards would also be recycled or disposed of off-site.

  Soils removed off-site would be hauled to several defunct quarries in the Tomales Point portion of the Seashore that the Park Service is actively trying to restore as described under Alternative A. Excavated sediment under this alternative would be used to restore the Grossi, Evans, McClure DG, and Evans-Abbotts quarries (Figure 10). Sediments would be hauled to these quarries using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road. From Pierce Point Road, trucks would use existing unpaved ranch roads and, in one case, a pasture to reach quarries. A separate quarry close-out plan has been developed to ensure structure integrity of fill to the quarries and minimization of weeds from the Project Area being spread elsewhere. Compliance on the quarry close-out plans is being conducted separately, and completion is not required to be completed before disposal takes place. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.



Alternative or Alternative Components Considered, but Not Analyzed Further

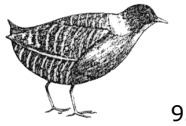
During the alternatives development process, the project team may evaluate a wide range of options before selecting alternatives or alternative components that will be carried forward for further analysis. Decision-making on whether an alternative or component is reasonable and distinct during the alternative development process should be strongly tied to the ability of alternative or alternative components to meet the project purpose and objectives and available information on existing natural and cultural resources, conflicts with existing land uses, human health and safety needs, and potential for socioeconomic impacts. Through consideration of objectives and planning criteria and use of available information, the project team eliminates alternative approaches or frameworks (conceptual models for developing alternatives), alternatives (approach incorporating major actions that are developed based on a framework), or alternative components or actions (specific tasks or actions within alternatives) that are considered infeasible for technical or economic reasons and that are therefore not carried forward for further analysis. Listed below are some of the alternative framework, alternatives, and alternative actions that were considered, but not analyzed further.

Alternative approaches or frameworks, alternatives, or alternative components or actions considered infeasible for technical or economic reasons were not carried forward for further analysis.

1. **Alternative Framework**: ***Restoration to Historic Conditions***. Many wetland restoration projects attempt to recreate historic conditions prior to disturbance from development and other negative impacts. This restoration framework was deemed infeasible. Since the 1860s, when Tomales Bay was first mapped by the U.S. Coast Survey, Tomales Bay -- and particularly the southern portion of Tomales Bay -- has been subject to a tremendous amount of sedimentation from disturbances in the upper portion of the watershed. In the late 1800s, almost one-third of the Giacomini Ranch was subtidal or intertidal mudflat. Since then, these areas have filled in, and the delta extends a considerable distance into the Bay. A tremendous amount of excavation would be required to return the Giacomini Ranch and Olema Marsh wetlands to this historic condition. Excavation would be exorbitantly expensive in terms of excavation and disposal costs and, ultimately, may not be feasible or self-sustaining within the current watershed context, such that the Project Area might fill in somewhat rapidly over time and move back towards existing topographic conditions. Because of the dynamism of this system, the project team felt that a framework based on restoring natural processes and functions was more sustainable in the long-term and might provide more benefits to the Project Area and surrounding watershed.

2. **Alternative**: ***Phased Approach to Restoration***. The feasibility study prepared by Philip Williams & Associates (1993) advocated a phased approach to restoration that would have broken the Giacomini Ranch into restoration "cells" through construction of temporary levees. This approach was intended to assist with gradual phasing out of the existing dairy operation. It was eliminated from consideration, because a phased approach would have caused substantial temporary impacts from construction and removal of temporary levees and would be extremely expensive, and it offered no environmental, technical or economic advantages. Because of the Park Service's agreement with the Giacomini family, phasing out of dairy operations is not required.

3. **Alternative**: ***Restoration of West Pasture Only***. The alternatives carried forward for detailed analysis includes an alternative that incorporates restoration of the East Pasture only. This alternative was developed to avoid potential impacts to the federally threatened California red-legged frog, which breeds in a freshwater marsh in the West Pasture, and to private homes that directly adjoin the West Pasture. Restoring only the West Pasture would not result in impact avoidance and would bring less benefit to the southern Tomales Bay watershed from the perspective of total number of acres of



wetlands restored. Because it would restore less than half of the Giacomini Ranch, it would not meet the project purpose of restoring a "significant portion" of the Project Area. For this reason, this alternative was considered, but eliminated from further analysis.

4. **Alternative**: ***Natural Degradation of Levees***. Restoration costs could be reduced if all the levees were left and simply allowed to degrade naturally. This alternative was dismissed as an Action Alternative, because it is not considered active restoration. To some extent, Alternatives A and B, as well as the No Action Alternative, incorporate this idea, but Alternatives A and B involve an active restoration component, as well. The restoration response under conditions of natural degradation would be potentially too incomplete and unpredictable to restore a "significant portion" of the Project Area. In addition, natural degradation of levees was considered to increase potential water quality impacts to Tomales Bay of increased sedimentation over alternatives that remove part or all of the levees.

5. **Alternative Action-Restoration**: ***Filling of Existing Tomasini Creek Channel***. Filling of the existing Tomasini Creek channel once it was realigned into one of its historic alignments was initially considered, because it would restore more of the natural conditions and would have been an excellent location for disposing of excess excavated material. However, it was dropped from consideration, because the federally endangered tidewater goby was found in the existing creek channel, and this action would be potentially incompatible with recovery efforts.

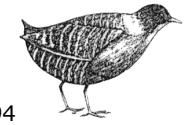
6. **Alternative Action-Restoration**: ***Removal and/or Regrading of Tomasini Creek Levee***. Removal of the Tomasini Creek levee was considered, as well as regrading without removal. However, both these components were dropped, because of need to minimize construction impacts in the vicinity of the federally endangered tidewater goby and to keep excavation to the minimum critical to achieve the restoration purpose and objectives.

7. **Alternative Action-Restoration**: ***Tidal Channel Creation in West Pasture***. Creation of tidal channels was initially considered for both the West and East Pastures, but creations was eventually eliminated from the West Pasture, because the soils present in the West Pasture are much more conducive than those in the East Pasture to natural channel formation and, therefore, were assumed to not require excavation to reestablish.

8. **Alternative Action-Restoration**: ***Build Berm around West Pasture Freshwater Marsh and Residences along Sir Francis Drake***. Because of concerns regarding tidal flooding of the Freshwater Marsh and two private properties in the West Pasture, the concept of creating a low berm around the Freshwater Marsh and homes was discussed initially. However, it was discarded, because the berm would actually exacerbate the primary driver of flooding of the private properties by damming waters and sediment from a small drainage (1906 Drainage) that flows down off the Inverness Ridge between the two homes. The berm would also have been visually intrusive and contrary to the project purpose and objectives of restoring natural process and function. As for the Freshwater Marsh, the decision was made to focus efforts on creating alternative freshwater marsh habitat in sustainable locations that would not be subject to regular tidal influence.

9. **Alternative Actions-Restoration**: ***Olema Marsh***.

   - *Causeway on Levee Road*: Construction of a causeway across the mouth of Olema Marsh on Levee Road was envisioned initially as an approach to enable more hydrologic interaction between the marsh and Lagunitas Creek and Giacomini Ranch. Baseline topographic surveys showed that this idea was infeasible due to the fact that the White House Pool county park area in between Levee Road and Lagunitas Creek would also need to be excavated significantly to establish any floodplain interaction with Olema Marsh. The County of Marin Parks and Open Space District, which leases this land from the State of California's Wildlife Conservation Board, had concerns about losing some of the values and use of the existing park.
   - *Excavating Secondary Channel Off Bear Valley Creek in Olema Marsh*: Excavation of a secondary channel off Bear Valley Creek just upstream of the Levee Road culvert was discussed, but dismissed due to concerns about potential impacts to federally threatened California red-legged frog, which have been observed on the western perimeter of the marsh, and a belief that the channel might develop naturally without excavation.



10. **Alternative Action-Public Access**: ***Location of Bridge for Southern Perimeter Through-Trail near White House Pool***. Rather than locating the permanent bridge incorporated into the Southern Perimeter Through-Trail at the location of the old summer dam, an alternate suggestion was to extend the trail along Lagunitas Creek to White House Pool and to construct a bridge just north of White House Pool. This approach would eliminate the need to have a section of cantilevered trail along Sir Francis Drake Boulevard at White House Pool corner, which would be a technically complex and expensive component of any trail between Point Reyes Station and Inverness Park. However, hydraulic modeling conducted as part of baseline surveys has shown that, at least currently, most of the overbank flooding of the Giacomini Ranch during larger storm events occurs at the southwestern corner of the East Pasture just near White House Pool. In addition, this bridge would have straddled or run perpendicular to the San Andreas Fault rather than parallel to it as is currently proposed. The San Andreas Fault is located in an Alquist-Priolo Earthquake Fault Zone, where development is strictly regulated by counties. Locating a trail and bridge in this location would increase risks to public safety and the potential for damage or loss of public access infrastructure.

11. **Alternative Action-Public Access**: ***Extending Proposed Southern Perimeter Through-Trail to Inverness***. Some in the local community have advocated for a trail from Point Reyes Station that would extend all the way to Inverness. The feasibility of this alignment was originally studied as part of the West Marin Pathways study and was considered technically complicated to construct due to the narrowness, absence of a wide road berm, and proximity to subtidal and intertidal lands of Tomales Bay (Brian Wittenkeller & Associates and Copple Foreaker & Associates 1988). The Park Service and CSLC limited evaluation of public access alignments to those that either fell on or bordered Park Service and CSLC lands. From the north levee of Giacomini Ranch, the lands on the east side of Sir Francis Drake Boulevard, a County of Marin-maintained road, are largely under private ownership.

Undiked Salt Marsh

12. **Alternative Action-Public Access**: ***Seasonal Bridge for Southern Perimeter Through-Trail***. Installation of a seasonal bridge rather than a permanent bridge at the location of the old summer dam as part of the Southern Perimeter Through-Trail was initially considered. This bridge would have been removed during the rainy season. However, this approach was ruled out due to complicated logistics associated with moving and storing the bridge and associated high cost, as well as interest of the public, particularly members of the local community, in using the bridge year-round on a weather-dependent basis, just as the unimproved trail in White House Pool County Park is used.

Alternative or Alternative Components Subjected to Additional Analysis to Determine Feasibility Prior to Elimination from Further Analysis

Some alternatives or alternative actions or components required more detailed technical and economic analysis before a decision could be made as to whether to carry these alternatives forward for analysis. Alternatives or alternative actions that required more detailed analysis are listed and described below.

Eliminated Alternatives – Public Access

In 2004, the Park Service and CSLC contracted for some further technical evaluation of public access in response to the considerable public scrutiny of the public access portion of the proposed project. This

evaluation, which was prepared by the hydrologic consultant, Kamman Hydrology & Engineering, Inc. (San Rafael, Calif.) with technical assistance from its biological consultant subcontractor, LSA Associates (Richmond, Calif.), and the Park Service, focused specifically on hydrologic, cultural, and biological resources, as well as potential constraints to resource-related portions of the project purpose and objectives (Phase I report; KHE et al. 2004). The alignments and infrastructure locations included in the analysis came from suggestions received during public scoping, internal scoping, public access studies conducted in the past (West Marin Pathway Study; Wittenkeller & Associates and Copple Foreaker & Associates 1988), and other documents (e.g., draft County of Marin General Plan 2004).

This technical evaluation recommended that the Park Service and CSLC narrow their consideration of potential public access alignments and infrastructure locations to those that do not constrain or impinge upon the project purpose and objectives of restoring natural hydrologic and ecological processes and functions and that have the lowest potential environmental impacts. After review of the report, the Park Service and CSLC went with this recommendation and carried forward those public access alignments and locations that were rated as having low to moderate environmental impacts for a second phase of study. The second phase of study specifically focused on technical feasibility, land use impacts, and costs of those public access alignments with low or moderate environmental and cultural resource impacts and was prepared by LandPeople Landscape Architects (Benicia, Calif.; 2005). Information from these studies was used to develop public access approaches and components or actions for each of the alternatives carried forward for more detailed analysis.

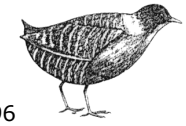
Public access alignments and infrastructure that were evaluated ***in one or both*** phases of study, ***but not carried forward for further analysis*** included:

- ***Extending proposed Southern Perimeter Through-Trail to Drakes View Drive in Inverness Park***. This alignment was considered during both the Phase I and Phase II studies, but was not incorporated into an alternative carried forward for further analysis. These and other alignments on the western side of Tomales Bay would be evaluated as part of future, potentially collaborative project between the County of Marin and the Park Service (see Public Access under Alternative A for more detail).

- ***Routing the Proposed Southern Perimeter Through-Trail over the Green Bridge***: This alignment was considered during both the Phase I and Phase II studies for incorporation into the proposed project, but was not incorporated at a project-level evaluation into the final design. This alignment would eliminate the need for a new bridge across Lagunitas Creek by improving the pedestrian causeway along the existing Green Bridge and then routing the trail along Levee Road. It would connect to the White House Pool County Park near Olema Marsh. This alignment raised substantial concerns during the West Marin Pathways Study (Wittenkeller & Associates and Copple Foreaker & Associates 1988) and during public scoping and workshops for the proposed project from members of the local community regarding safety along Levee Road, which is one of the main County thoroughfares in this area, and impacts from noise and traffic to landowners on Levee Road and in the town of Point Reyes Station.

  During public comment on the DEIS/EIR, many members of the local community, including adjacent residents, called on the Park Service and the County of Marin to reevaluate the feasibility of this option and advocated its use over construction of a non-vehicular bridge to create a southern perimeter trail system. For this reason, the potential for the Park Service to collaborate with the County of Marin in the future on development of a trail in this location has been incorporated as a programmatic-level component into Alternative D, although the potential for construction of a bridge has not been eliminated entirely as another option should this one not prove feasible through a separate environmental compliance process.

- ***Connecting Mesa Road to Tomales Bay Trail through use of Tomasini Creek berm***: This alignment was considered during the Phase I study, but not carried forward for further analysis in the Phase II study. Use of Tomasini Creek berm rather than historic railroad grade would require two bridges over the existing Tomasini Creek and improvement and widening in many areas of the degraded Tomasini Creek berm. In addition, it would make the berm a permanent feature. This alignment was dismissed from further consideration, because it conflicted with the project purpose and objectives of restoring – or allowing for the development of – natural hydrologic and ecological processes and functions.



- ***Connecting Point Reyes Station to western side of Tomales Bay using the historic railroad grade and a bridge at the north levee of the Giacomini Ranch***: This alignment was considered during the Phase I study, but not carried forward for further analysis in the Phase II study. This alignment was evaluated, but eliminated from further analysis, because of the high impacts that the alignment would have on natural hydrologic processes and special status species such as the California black rail and the California clapper rail. One of the most hydrologically dynamic zones in the southern portion of Tomales Bay is the northern end of the Giacomini Ranch (KHE et al. 2004). Installation of a trail and bridge in this location would increase risks to public safety and have a potentially substantial adverse effect on natural hydrologic processes, including tidal action (KHE et al. 2004).

- ***Connecting Point Reyes Station to western side of Tomales Bay with a trail that would go through the middle of the Giacomini Ranch Project Area via a Bridge***: This alignment was considered during the Phase I study, but not carried forward for further analysis in the Phase II study. This trail alignment, which was proposed in the draft County of Marin General Plan document, but removed from subsequent versions of the Plan, was eliminated because of the high potential impacts to natural hydrologic processes and associated biological resources. In addition, long-term sustainability of a bridge in this location was perceived as low due to the dynamic nature of Lagunitas Creek in this area.

Eliminated Alternatives-Restoration: Olema Marsh

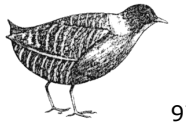
Since 2004, the Park Service and CSLC have been working with hydrologic consultants on technical studies evaluating topography, hydrology, and sediment dynamics of the Bear Valley Creek-Olema Marsh system. Early on, topographic information suggested that consideration of a causeway across the entire mouth of Olema Marsh was infeasible. The project team, then, focused efforts on removing constraints to natural hydrologic process by replacing culverts. During the alternative workshops in 2004, the Seashore presented two alternative designs for Olema Marsh restoration as part of Alternatives C and D.

- ***Alternative C for Olema Marsh- 2004 Version***: Alternative C would have replaced the Levee Road culvert with a 26-foot arched culvert or bridge and deep excavation of the Bear Valley creek channel to Bear Valley Road. Excavated materials would have been used to create a berm on the west side of the creek to minimize drainage of the western portion of the marsh into the creek to maintain ponded conditions for California red-legged frog and other aquatic wildlife species.

1. ***Alternative D for Olema Marsh-2004 Version***: Alternative D made more of an attempt to recreate historic conditions by maximizing tidal influence. The Levee Road culvert would have been replaced with a 120-foot causeway, and the channel mouth would have been widened to approximately 70 feet. A section of the marsh adjacent to Levee Road would have been excavated to increase tidal intrusion. This alternative also included deep excavation of the Bear Valley Creek channel to Bear Valley Road and construction of a retention berm/alluvial levee.

Following the workshops, the Park Service and CSLC began examining the feasibility and potential benefits of replacing the Bear Valley Road culverts, as well as the Levee Road culverts. This alternative action was included in subsequent representations of both Alternatives C and D, and the proposal to construct a 125-foot causeway on Levee Road in Alternative D was eliminated. Both Alternatives C and D now incorporated 26-foot arched culverts at both Levee Road and Bear Valley Road. In addition, the large excavation in Alternative D near Levee Road was dropped as not providing enough benefit for the potential cost, as well as potentially increasing threats to the California red-legged frog population that has been observed in the western portions of the marsh. In the spring of 2005, hydrologic consultants concluded additional technical feasibility studies that suggested that the culverts may not be the primary impediment to functioning hydrologic processes within Olema Marsh. A gravel sill, possibly a remnant from past fill events associated with sediment disposal after storms, appeared to be acting as a miniature dam and impounding water levels in Olema Marsh at elevations actually above that of the downstream culvert. Removal of this feature was added as a component to both alternatives.

During the Value Analysis process, the Value Analysis Team evaluated the current Olema Marsh alternatives using a cost-benefit analysis and proposed that the alternatives be modified to adopt a more adaptive management approach to restoration. The first step would involve the least costly – and, based on technical



analyses, most potentially beneficial – restoration actions, specifically removal of the gravel sill and shallow rather than deep excavation of Bear Valley Creek to establish to a flow-path for the creek and increase hydraulic connectivity. These actions would be implemented and, then, should these actions not appear to achieve the desired level of restoration, the Park Service and ACR would pursue additional restoration actions such as replacing the culverts on Levee and/or Bear Valley Roads.

Impact Avoidance and Mitigation Measures

Impact avoidance and mitigation measures refer to measures and practices adopted by a project proponent to reduce or avoid adverse effects that could result from construction or operation of the proposed features. CEQ recommends consideration of five types of mitigation measures: avoiding, minimizing, rectifying, reducing, and compensating (40 C.F.R. 1508.20). Mitigation measures that are mandatory to implementation of the proposed project are discussed in this section and include Best Management Practices (BMPs) to avoid, minimize, or reduce the impact from construction. Optional mitigation measures that are subject to further discussions with regulatory agencies are discussed in Chapter 4 under individual impact topics. In some cases, mitigation measures were incorporated into the design of the alternatives and are not specifically identified. A number of BMPs would be adopted as part of the selected alternative and would be incorporated into construction documents (plans and specifications), providing a contractual requirement that any contractor retained for any phase of the action would abide by the conditions and procedures identified in this document and permits.

The following sections describe the impact avoidance and mitigation measures that would be implemented for the selected alternative.

Engineering Geologic/Geotechnical Measures

Should the proposed project involve construction of structures such as bridges, the Park Service and CSLC would retain a state-licensed engineering geologist to prepare a geotechnical report in conformance with the State Seismic Hazards Mapping Act and County regulations that evaluates soil, slope, and geologic conditions; availability of sufficient and suitable land for development within Alquist-Priolo Earthquake Zoning Act;' potential mitigation measures to reduce risk; and on-site structural engineering. Design recommendations would be presented to the Park Service and CSLC in the form of written soils engineering and engineering geologic reports. The geologic and geotechnical personnel would also be responsible for monitoring earthwork and construction to ensure compliance with applicable codes and standards and with the recommendations of the soils and engineering geologic reports.

Design and Construction Commitments

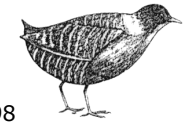
The Park Service and CSLC would ensure that design and construction of project features, including earthwork and infrastructure, proceeds in accordance with the appropriate codes and standards. Applicable codes are as follows.

- Restoration and spoils disposal earthwork: Caltrans Standard Specifications (California Department of Transportation 1999).
- Structural features for water conveyance: relevant guidance of the American Waterworks Association.
- Other structural features, such as bridge or boardwalk: Uniform Building Code (International Conference of Building Officials 1997).

Measures to Protect Water Quality

During implementation of the selected alternative, contractors would abide by the following stipulations in order to protect water quality within the Project Area and downstream of the Project Area:

- Conduct construction activities during the dry season.



- Conduct construction work in accordance with site-specific construction plans that minimize the potential for increased delivery of sediment to surface waters.
- Ensure that concentrated runoff and concentrated discharge are diverted away from channel banks.
- Minimize removal of and damage to native vegetation.
- Install temporary construction fencing to identify areas that require clearing, grading, revegetation, or recontouring, and minimize the extent of areas to be cleared, graded, recontoured, or otherwise disturbed.
- Grade and stabilize spoils sites to minimize erosion and sediment input to surface waters and generation of fugitive dust (see discussions under Measures to Protect Air Quality below).
- As appropriate, implement erosion control measures to prevent sediment from entering surface waters, including the use of silt fencing or fiber rolls to trap sediments and erosion control blankets on slopes and channel banks.
- Avoid operating equipment in flowing water by using temporary cofferdams and/or other suitable structures to divert flow around the channel and bank construction area.

Measures to Protect Wildlife

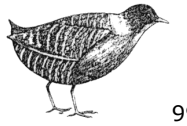
Measures for Migratory Birds

As noted in Chapter 1 in the discussion of the federal ESA and Migratory Bird Treaty Act (MBTA) and the state CESA, the presence of breeding or nesting endangered and threatened species or migratory bird species can affect construction phasing and implementation approach. Because the Project Area and adjacent lands support both federally and state-listed endangered and threatened species, as well as numerous bird species covered under the MBTA, project construction might not be able to start until summer -- and possibly even later summer -- depending upon regulatory mandates regarding the period of avoidance for particular special status species or the presence of active nests. To prevent disturbance of migratory birds, no project-related activities would take place during the migratory bird nesting season (March 1–August 15). To provide additional assurance, the Park Service and CSLC would conduct preconstruction surveys for migratory birds and their nests within the Project Area no more than 1 week prior to the initiation of site preparation, staging, or construction activity planned before August 15. If pre-construction surveys identify active nests belonging to common migratory bird species, a 100-foot exclusion zone would be established around each nest to minimize disturbance-related impacts on nesting birds. If active nests belonging to special-status migratory birds are identified, a no-activity buffer zone would be established around each nest. The radius of the no-activity zone and the duration of exclusion would be determined in consultation with the USFWS.

Impact avoidance and mitigation measures refer to measures and practices adopted by a project proponent to reduce or avoid adverse effects that could result from construction or operation of the proposed features

Measures for Aquatic Species

Before any potential de-watering activities begin in any creeks within the Project Area, the Park Service and CSLC would ensure that native aquatic vertebrates and larger invertebrates are relocated out of the construction area into a flowing channel segment by a qualified fisheries biologist. In deeper or larger areas, water levels would first be lowered to manageable levels using methods to ensure no impacts to fisheries and other special status aquatic species. A qualified fisheries biologist or aquatic ecologist would then perform appropriate seining or other trapping procedures to a point at which the biologist is assured that almost all individuals within the construction area have been caught. These individuals would be kept in buckets with aerators to ensure survival. They would then be relocated to an appropriate flowing channel segment or other appropriate habitat as identified by the Park Service and CSLC in consultation with NMFS or the appropriate



agency. Construction activities would be prohibited from unnecessarily disturbing aquatic habitat. Federally threatened or endangered aquatic species that occur within the Project Area either as residents or non-residents are coho salmon, steelhead salmon, chinook salmon, green sturgeon, tidewater goby, and California freshwater shrimp, in addition to other state or formerly listed species that would need to be protected such as the northwestern pond turtle and southwestern river otter.

To ensure against adverse impacts on the federally threatened California red-legged frog, which has been observed in both the West and East Pastures and Olema Marsh, the Park Service and CSLC would conduct pre-construction clearance surveys for this species. A biologist would survey the construction area on a daily basis to ensure that frogs or other species have not moved in during the night. Frogs that have moved into the area would be captured and relocated to habitat outside of the construction area.

Measures to Protect Vegetation and Prevent the Introduction and Spread of Invasive Plant Species

Best Management Practice standards (BMPs) to protect riparian and wetland vegetation during construction would be incorporated into construction documents (plans and specifications) for the proposed action. They would include, but may not be limited to, the following:

- Requiring the use of temporary construction fencing to delimit work areas. Requiring that fencing be installed before site preparation work or earthwork begins.
- Excluding foot and vehicle traffic from particularly sensitive areas by delimiting exclusion areas with temporary construction fencing and flagging tape in a conspicuous color.
- Washing off the tires or tracks of trucks and equipment entering and leaving project sites to prevent seed transport.

Measures to Protect Wetland Resources

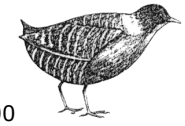
BMPs to protect wetland resources during construction would be incorporated into construction documents (plans and specifications) for the proposed project. They would include, but may not be limited to, the following.

- Where possible, construction access and staging shall occur in uplands and non-riparian habitat.
- If construction access or staging must occur in wetlands and riparian habitat, access within these areas shall be kept to the minimum road width and acreage possible. Contractors would work with Park Service personnel to minimize impacts to wetlands and riparian habitat.
- Construction access routes would be flagged to ensure that construction equipment does not detour from authorized entry points and access routes.
- Where possible, construction equipment would work from upland locations to minimize impacts to wetlands and riparian habitats.
- Any temporary "fill" or staging material placed in wetlands would be removed to upland locations at the earliest possible date.
- Construction equipment would be cleaned prior to construction start to ensure that no seeds or vegetative fragments of invasive, non-native species are introduced into the Project Areas.

Spill Prevention and Response Plan

Construction contractors would prepare a spill prevention and response plan that regulates the use of hazardous and toxic materials, such as fuels and lubricants for construction equipment. The Park Service or designated representatives would oversee implementation of the spill prevention and response plan. Elements of the plan would ensure that:

- workers are trained to avoid and manage spills;



- construction and maintenance materials are prevented from entering surface waters and groundwater;
- a spill kit with boom and sorbent materials would be on site at all times during construction;
- spills are cleaned up immediately and appropriate agencies are notified of spills and of the cleanup procedures employed;
- staging and storage areas for equipment, materials, fuels, lubricants, solvents, and other possible contaminants are located at least 100 feet away from surface waters;
- no vehicles will be fueled, lubricated, or otherwise serviced within 100 feet of the normal high-water area of any surface water body.
- vehicles are immediately removed from work areas if they are leaking; and
- no equipment is operated in flowing water (suitable temporary structures are installed to divert water around in-channel work areas).

Measures to Protect Natural Quiet and Soundscapes

Construction contractors would implement the following measures to reduce construction noise and lessen the impacts of noise that cannot be avoided.

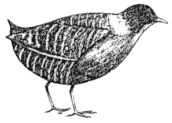
- Construction equipment would be required to have sound-control devices at least as effective as those originally provided by the manufacturer, and no equipment would be operated with an unmuffled exhaust. In general, construction would take place between 7:00 a.m. and 7:00 p.m., Monday through Saturday.
- In addition, Park Service would post signs at the Project Area and on the Park website providing the name and contact information for a Park Service staff member that the public can contact with noise concerns. This person would be responsible for recording and monitoring complaints related to construction noise and for ensuring that logged complaints are mitigated to the maximum extent possible. Construction times and contact information for noise concerns would also be publicized in the Park newsletter.

Measures to Protect Air Quality

Construction contractors would implement the following measures to control the generation of fugitive dust during site preparation and construction activities. These "Enhanced Control Measures" are contained in the Bay Area Air Quality Management District's (BAAQMD's) Feasible Control Measures for PM10 Emissions[1] from Soil Removal Activities (BAAQMD 1999).

- Cover trucks hauling soil, sand, or other loose materials, or require them to maintain at least 2 feet of freeboard.
- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets.
- Apply (nontoxic) soil stabilizers to inactive earthwork areas (previously graded areas inactive for 10 days or more).
- Where possible, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites. If necessary, Water all active construction areas at least twice daily.
- Enclose, cover, water twice daily, or apply nontoxic soil stabilizers to exposed stockpiles (dirt, sand, etc.) as necessary.
- Limit traffic speeds on unpaved roads to 10 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

[1] *PM10* refers to particulate matter with a diameter of 10 microns or less. Material of this size is small enough to be drawn deep into the lungs when inhaled and thus poses a human health hazard.



- Replant vegetation or topsoil disturbed areas as quickly as possible.
- Limit the area subject to excavation, grading and other construction activity at any one time.
- Maintain properly tuned equipment and limit idling time to 5 minutes.
- Wash tires of hauling trucks before exiting Project Area onto local roads.

Measures to Address Effects on Traffic

The construction contractor would be required to prepare and implement a traffic safety plan. The traffic safety plan would address appropriate vehicle size and speed, travel routes, closure plans, detour plans (if any), flagperson requirements (if any), locations of turnouts to be constructed (if any), coordination with law enforcement and fire control agencies, measures ensuring emergency access, and any additional need for traffic or speed-limit signs. Delivery and haulage access, including contractor mobilization and demobilization, would be scheduled to minimize impacts on traffic on area roadways. Construction worker parking and access would be managed to avoid impeding access for park visitors and emergency vehicles.

Measures to Protect Public Services

Affected local community residents would be notified one week prior to any disruptions in any public services, including water or power.

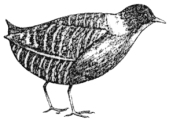
Miwok Dancer

Measures to Protect Cultural Resources

The Park Service would coordinate with the Federated Indians of Graton Rancheria (FIGR) to ensure that either a Park Service or FIGR representative is on-call during the construction activities. While the proposed alternatives would not appear to be affecting documented resource areas, with the exception of the historic railroad grade, a Park Service or FIGR would be on-call to ensure that construction activities do not impact cultural resources that have not been previously documented. In the case that resources are discovered during the course of construction, the Park Service would act immediately and appropriately as documented in 36 CFR 800.13 "Post-review discoveries" (http://www.achp.gov/regs.html #800.13).

Measures to Protect Recreational Use

The Park Service and CSLC would take feasible measures to minimize the effects of project construction on recreational use. Information on upcoming closures, including closure dates and arrangements for alternate parking, restroom facilities, and trail access points would be posted on the park website, distributed at the Bear Valley Visitor Center, and posted at the construction site. Information on alternate recreational opportunities would be publicized on the park website, in the park newsletter, and in signage at the construction sites where closures are necessary. The Park Service and CSLC are committed to working with the birding community to develop informational signage that explains the reasons for the change and identifies other nearby birdwatching areas.



The Environmentally Preferred Alternative

Park Service policy regarding implementation of NEPA requires that an environmentally preferred alternative be identified in all NEPA analysis documents. Determination of this alternative takes place after the environmental analysis is complete. The environmentally preferred alternative is the alternative that would promote national environmental policy as expressed in NEPA and cause the least damage to the biological and physical environment. Essentially, this means the environmentally preferred alternative is the one that causes the least damage to the biological and physical environment or best perpetuates natural physical and biological processes. It also means that it is the alternative that is best suited to protect, preserve, and enhance historic, cultural and natural resources and process.

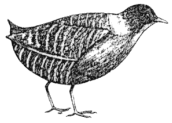
After analyzing the alternatives described in this document, the Park Service and CSLC have determined that Alternative D is the environmentally preferred alternative, although Alternative C has very strong environmental merits, as well. Alternative D includes the most extensive restoration of wetlands, riparian habitat, and other aquatic systems and minimizes the impacts associated with incorporating public access on the perimeter of the Project Area, which contains large amounts of wetlands and riparian areas due to the groundwater influence from adjoining terraces and mountain ridges. Although Alternative C would also provide a substantial amount of restoration of wetlands and riparian habitat, the degree of restoration is slightly less extensive as it would not fully remove Tomasini Creek from its levees, would not replace culverts on Tomasini Creek at Mesa Road, and would include construction of a bridge over Lagunitas Creek that may impact, to some degree, natural hydrologic processes. However, Alternative C would involve considerably less excavation, hauling, and off-site disposal, with differences in off-site disposal needs between Alternatives C and D estimated at approximately 50,000 cubic yards (Figure 9). Increases in the number of truck trips needed to haul excavated sediment to off-site disposal areas affect the environment through increasing air pollution, demand for non-renewable energy resources, and traffic in the local community and region. Of the five alternatives, the No Action Alternative would provide the least amount of restoration and public access opportunities.

Sections 101(b) and 102(1) of NEPA

The Council on Environmental Quality regulations requires that an EIS discuss how each alternative achieves the requirements of sections 101(b) of NEPA. This section states that federal agencies should, through the selection of the alternative to be implemented, attempt to:

- *Criterion 1*: Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- *Criterion 2*: Assure for all visitors a safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- *Criterion 3*: Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- *Criterion 4*: Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- *Criterion 5*: Achieve a balance of population and resource use which would permit high standards of living and a wide sharing of life's amenities; and
- *Criterion 6*: Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternatives C-D perform best on Criteria 1 and 2 in that they maximize through more extensive restoration in both the Giacomini Ranch and Olema Marsh benefits to the environment that can be enjoyed by succeeding generations and would produce more aesthetically pleasing surroundings. The No Action Alternative may also meet Criterion 2 if leased grazing was permitted in that it would continue – and perhaps even improve -- the existing Pastoral Landscape, which is considered from a visual point of view both aesthetically and culturally pleasing in the western portions of Marin County and elsewhere.



Alternatives C and D would offer the widest range of beneficial uses of the environment over the long-term, although there might be some short-term degradation during the transitional phase as the Giacomini Ranch and Olema Marsh adjust to changed conditions. Alternatives A and B would have less benefit to the environment with the most potential for degradation because of loss of wetland, riparian, and bluff habitat from construction of the Eastern Perimeter through-trail and possibly extension of the Southern Perimeter Trail to Inverness Park at some point in the future, particularly if it were extended by widening the Sir Francis Drake Boulevard road berm.

Alternative B would, in many ways, offer the most in terms of decreasing existing risks to health or safety from flooding by reducing vertical flood elevations for adjacent homes along Levee Road and Sir Francis Drake Boulevard without any potential for causing other undesirable and unintended consequences. While Alternatives C – D would reduce potential flooding from both Lagunitas and Bear Valley Creeks for homes along the western portion of Levee Road more than Alternative B, they would, conversely, potentially result in a slight increase in vertical flood elevations for undeveloped portions of properties along the east side of Sir Francis Drake Boulevard relative to existing conditions and, because of restoration of Olema Marsh, possibly increase the potential for salinity intrusion events in municipal groundwater wells operated by North Marin Water District. Increased flooding of the undeveloped portions of properties would not affect homes, driveways, or access roads and, therefore, would not increase risks to public health and safety. In addition, the Park Service, CSLC, and Audubon Canyon Ranch would not proceed with full restoration of Olema Marsh until it could be determined that restoration would not affect local water supply.

While none of the cultural landscape features is eligible for listing in the National Register of Historic Places, all five alternatives would preserve the historic railroad grade on the eastern perimeter of the Giacomini Ranch, while only the No Action Alternative would preserve the two manure lagoons on the Dairy facility mesa.

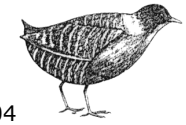
Criterion 5 discusses those alternatives that achieve a "wide sharing of life's amenities." In terms of the proposed project, this phrase was taken to mean those alternatives that offer the most benefits for plants and wildlife, as well as for humans with and without disabilities. These alternatives would offer opportunities for people, including those with disabilities, to experience, enjoy, and learn from the restored landscape through sensitively designed public access facilities that do not fragment important wildlife habitats or cause potential for disruption of natural processes and wildlife activities such as breeding, nesting, and foraging. From this perspective, Alternative C would appear to offer the best benefits in terms of sharing resource amenities, because it offers a moderate amount of public access facilities, including an ADA-compliant access component, that do not degrade or fragment important vegetation communities or wildlife habitat. Alternative B would be ranked second probably for Criterion 5. Criterion 6 is not applicable to the proposed project.

In addition to Section 101(b), Park Service policy also directs that all environmental analysis documents address compliance with Section 102(1) of NEPA. This section states that the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forward in NEPA. In the Park Service, this requirement is met by disclosing any inconsistencies between the alternatives analyzed in detail and other environmental laws and policies. None of the alternatives developed and analyzed in detail are inconsistent with other environmental laws and policies.

The Preferred Alternative

Alternative D has been selected as the alternative preferred by the Park Service and CSLC. This alternative was selected during preparation of the FEIS/EIR based on comments received during the DEIS/EIR public review period. Alternative D received overwhelming support from the public for selection of this alternative as the preferred alternative. This alternative has also been identified as the Environmentally Preferred Alternative.

Originally, the Park Service and CSLC had selected Alternative C. This was selected during the Value Analysis process by the Value Analysis team, which was comprised of Park Service and staff from other lead or partner agencies such as the CSLC and the County of Marin. While the Value Analysis team felt initially that Alternative C offered the best combination of restoration and public access benefits, the planning team subsequently reevaluated this decision based on the comment received during release of the DEIS/EIR. Many public comments expressed support for maximizing the opportunity for restoration and minimizing public access elements that might detract from restoration such as the non-vehicular bridge. Proposed public access



components that once received considerable support from the local community -- who would be both most affected by the facilities and most likely to use them -- received considerable opposition during the public comment period for the DEIS/EIR, while a number of people expressed support from one of the alternative elements that once received considerable opposition -- creation of a trail along Levee Road and the Green Bridge. In making the decision to switch to Alternative D, the planning team recognized that, based on the amount and types of comments that it received from individuals and agencies, public access components on the southern perimeter of the Project Area would appear to require additional study, analysis, and scoping before selection and implementation and were, therefore, "not ripe for decision" by NEPA standards.

The planning team has also elected to follow the suggestions of many of the commenters to work cooperatively with the County of Marin in the future on options for connecting the Park Service trails on the northern bank of Lagunitas Creek with existing and potentially new facilities on the southern bank of Lagunitas Creek. This type of approach is now included in Alternative D and was already included to some degree in the DEIS/EIR in Alternatives A-C in the programmatic component that could potentially extend the southern perimeter trail to Inverness Park. Under Alternative D, the Park Service would commit to working with the County of Marin on reevaluation of public access options on the southern perimeter of the Project Area, including Levee Road and the Green Bridge, extension of a trail to Inverness Park, and/or construction of a non-vehicular bridge across Lagunitas Creek at the location of the old summer dam. Implementation of any of these options would require completion of a separate environmental compliance process.

The Seashore's Superintendent has reviewed the five alternatives with respect to how well they meet the project purpose and objectives (Table 2) and their potential impacts on natural and social resources (Table 3) and approved the planning team's decision to choose Alternative D rather than Alternative C as the preferred alternative.

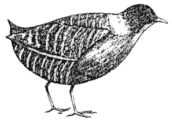


TABLE 2. DEGREE TO WHICH ALTERNATIVES MEET STATED OBJECTIVES OF PROPOSED PROJECT
IN ORDER OF BEST TO LEAST, ALTERNATIVES CAN 1) *FULLY*; 2) *LARGELY*; 3) *PARTIALLY*; OR 4) *NOT* MEET OBJECTIVES

OBJECTIVE	**NO ACTION ALTERNATIVE:** ***Continue Current Management, including Required Mitigation***	**ALTERNATIVE A:** ***Limited Restoration; Expanded Public Access***	**ALTERNATIVE B:** ***Moderate Restoration; Expanded Public Access***	**ALTERNATIVE C:** ***Full Restoration; Moderate Public Access***	**ALTERNATIVE D:** ***Extensive Restoration; Limited Public Access***
Restore natural, self-sustaining tidal, fluvial (streamflow), and groundwater hydrologic processes in a significant portion of the Project Area, thereby enabling reestablishment of some of the ecological processes and functions associated with wetland and riparian areas.	**Would Not Meet Objective** Wetland restoration within 11-acre mitigation component would NOT restore natural hydrologic and ecological processes and functions in a SIGNIFICANT portion of 550+-acre Project Area. Discontinuation of intensive agricultural management would allow for limited passive restoration in remainder of Giacomini Ranch.	**Would Partially Meet Objective** Alternative would actively and passively restore approximately 57 percent of Project Area through discontinuation of agricultural management, removal of agricultural infrastructure, and active restoration in East Pasture. There would be some passive restoration in 200-acre West Pasture, although retention of levees would reduce functionality. Olema Marsh would not be restored.	**Would Fully Meet Objective** Alternative would actively and passively restore approximately 90 percent of Project Area through restoration of entire 550-acre Giacomini Ranch. There would be no restoration of Olema Marsh. Restoration of natural processes and functions would occur within SIGNIFICANT portion of Project Area.	**Would Fully Meet Objective** Alternative would improve hydrologic and ecological functionality and conditions in Giacomini Ranch relative to Alternative B by removing more levees on Lagunitas and Tomasini Creeks, restoring upland and more riparian areas, and creating more tidal channels. Would also implement adaptive restoration component for Olema Marsh. Restoration of natural processes and functions would occur within SIGNIFICANT portion of Project Area.	**Would Fully Meet Objective** Alternative would improve hydrologic and ecological functionality and conditions in Giacomini Ranch relative to Alternative C by fully removing Tomasini Creek from its bermed channel and replacing culverts on Tomasini Creek and restoring more active marsh- and floodplain. Would also implement adaptive restoration component for Olema Marsh. Restoration of natural processes and functions would occur within SIGNIFICANT portion of Project Area.
Pursue a watershed-based approach to restoration in that restoration will emphasize opportunities to improve ecological conditions within the	**Would Not Meet Objective** There would be no restoration within most of Project Area. The 11-acre wetland mitigation component would NOT incorporate watershed-based approach to restoration.	**Would Largely Meet Objective** Discontinuation of agriculture would reduce potential Giacomini Ranch contribution to pollutant loading within Tomales Bay, listed as impaired under Clean Water Act. Levee breaching	**Would Fully Meet Objective** Alternative would have very similar benefits for Tomales Bay and watershed as Alternative A. Levee breaching in West Pasture and complete removal in East Pasture would further improve floodwater	**Would Fully Meet Objective** Alternative would have very similar benefits for Tomales Bay and watershed as Alternative B. Complete levee removal in West Pasture and partial removal on Tomasini Creek would slightly	**Would Fully Meet Objective** Alternative would have very similar benefits for Tomales Bay and watershed as Alternative C. Complete removal of Tomasini Creek from bermed channel would slightly increase floodwater storage

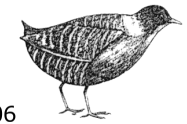


TABLE 2. DEGREE TO WHICH ALTERNATIVES MEET STATED OBJECTIVES OF PROPOSED PROJECT
IN ORDER OF BEST TO LEAST, ALTERNATIVES CAN 1) *FULLY*; 2) *LARGELY*; 3) *PARTIALLY*; OR 4) *NOT* MEET OBJECTIVES

OBJECTIVE	NO ACTION ALTERNATIVE: *Continue Current Management, including Required Mitigation*	ALTERNATIVE A: *Limited Restoration; Expanded Public Access*	ALTERNATIVE B: *Moderate Restoration; Expanded Public Access*	ALTERNATIVE C: *Full Restoration; Moderate Public Access*	ALTERNATIVE D: *Extensive Restoration; Limited Public Access*
entire watershed, not just in the Project Area itself. Pursue a watershed-based approach to restoration in that restoration will emphasize opportunities to improve ecological conditions within the entire watershed, not just in the Project Area itself (cont.).		in East Pasture would considerably improve floodwater storage, thereby reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Hydraulic modeling results point to East Pasture having largest potential role in floodwater retention and, therefore, water quality improvement. Limited active restoration in East Pasture and no restoration in West Pasture or Olema Marsh would reduce potential benefits for Tomales Bay wildlife.	storage within Giacomini Ranch relative to Alternative A, thereby further reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Expanded restoration in Giacomini Ranch would increase benefits in terms of food chain and habitat support for marine and estuarine species in Tomales Bay, even without restoration of Olema Marsh.	increase floodwater storage within Giacomini Ranch relative to Alternative B, thereby further reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Restoration of Olema Marsh would also reduce flooding on Levee Road from Bear Valley Creek. Expanded restoration in Giacomini Ranch and Olema Marsh would increase benefits in terms of food chain and habitat support for marine and estuarine species in Tomales Bay.	within Giacomini Ranch relative to Alternative C, thereby further increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Restoration of Olema Marsh would also reduce flooding on Levee Road from Bear Valley Creek. Relative to Alternative C, expanded restoration in Giacomini Ranch would slightly increase benefits in terms of food chain and habitat support for marine and estuarine species in Tomales Bay.
Incorporate opportunities to experience and enjoy the restoration process as long as opportunities do not	**Would Not Meet Objective** There would be no restoration within most of Project Area. Public access facilities would not be expanded beyond the	**Would Partially Meet Objective** Public access would be expanded considerably through construction of new facilities or improvement of existing facilities,	**Would Largely Meet Objective** Public access would be very similar to Alternative A in that it would be expanded considerably through construction of new	**Would Fully Meet Objective** Public access would be very similar to Alternative B in that it would be expanded through construction of new facilities or	**Would Fully Meet Objective** Public access would be scaled back relative to Alternatives A-C, with access focused on construction or improvement of spur

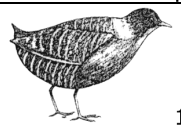


TABLE 2. DEGREE TO WHICH ALTERNATIVES MEET STATED OBJECTIVES OF PROPOSED PROJECT
IN ORDER OF BEST TO LEAST, ALTERNATIVES CAN 1) *FULLY*; 2) *LARGELY*; 3) *PARTIALLY*; OR 4) *NOT* MEET OBJECTIVES

OBJECTIVE	NO ACTION ALTERNATIVE: *Continue Current Management, including Required Mitigation*	ALTERNATIVE A: *Limited Restoration; Expanded Public Access*	ALTERNATIVE B: *Moderate Restoration; Expanded Public Access*	ALTERNATIVE C: *Full Restoration; Moderate Public Access*	ALTERNATIVE D: *Extensive Restoration; Limited Public Access*
conflict with the project's purpose or with other laws and policies. Incorporate opportunities to experience and enjoy the restoration process as long as opportunities do not conflict with the project's purpose or with other laws and policies (cont.). .	informal facilities that currently exist, and there would be no ADA-compliant access component.	including an ADA-compliant access component. As most of access would be along perimeter of East Pasture, which would be restored, access would allow opportunities for public to experience and enjoy restoration process. There is potential for extension of southern perimeter trail to Inverness Park in future, which would expand viewing and educational opportunities. Construction of eastern perimeter trail through importation of fill for a berm, however, would potentially conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies, because it would impact protected wetlands, riparian, and bluff habitat.	facilities or improvement of existing facilities, including an ADA-compliant access component. Trails and viewing areas or overlooks would allow opportunities for public to experience and enjoy restoration process. Construction of eastern perimeter trail would use a low-elevation boardwalk approach that would reduce the amount of impact to wetlands and hydrologic processes, although it would still impact riparian and bluff habitat and thereby potentially conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies.	improvement of existing facilities, although to a lesser degree than under Alternatives A-B. Trails and viewing areas or overlooks would still allow opportunities for public to experience and enjoy restoration process. Southern perimeter through-trail would be retained, along with potential for possible future expansion to Inverness Park. However, eastern perimeter trail would be converted to two spur trails, which would have much less potential to conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies. ADA-compliant access component would be retained, but shifted to the Mesa Road spur trail.	trails on eastern and southern perimeters. Through-trail access components are not included in the current project, although the potential exists for linking Southern Perimeter spur trail with facilities on south side of Lagunitas Creek through cooperative project with county. ADA-compliant access would be provided through improvement of trail and construction of small overlook at White House Pool County park. These trails and viewing areas or overlooks would still allow opportunities for public to experience and enjoy restoration process, although viewing opportunities would be somewhat reduced relative to Alternatives A-C. This alternative reduces potential for conflict with directives of Park Service, LCP, and county and community policies.

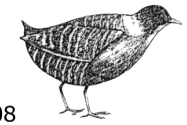


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Land Use and Planning						
General Land Use	*Conflict with GMP Policies*	**No Impact** GMP policies, land use standards, critical resources, and Park Service goals would not be affected.	**No Impact** GMP policies, land use standards, critical resources, and Park Service goals would not be affected.	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Modification of Natural Resources on Parklands	**Beneficial** **Moderate** Natural Resources would be altered by converting 11 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	**Beneficial** **Major** Natural Resources would be altered by converting ~189 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	**Beneficial** **Major** Natural Resources would be altered by converting ~200 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	**Beneficial** **Major** Natural Resources would be altered by converting ~200 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	**Beneficial** **Major** Natural Resources would be altered by converting ~206 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.
	Conflict with Development Policies in Coastal Zone	**No Impact** Development in the Coastal Zone would not be affected.	**No Impact** Development in the Coastal Zone would not be affected.	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Conflict with Industrial Development Policies in Coastal Zone	**No Impact** There would be no industrial development in the Coastal Zone.	**No Impact** There would be no industrial development in the Coastal Zone.	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Conflict with County Land Use Policies	**Adverse** **Negligible-Minor** Conversion from dairy to grazing or Open Space would affect land use, but change would not conflict with County Land Use policies.	**Adverse** **Negligible-Minor** Conversion from dairy to grazing or Open Space would affect land use, but change would not conflict with County Land Use policies.	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Same as Alternative A
	Conflict with County Environmental Plans/Policies	**Adverse** **Negligible-Minor** Environmental plans/polices would be affected, but there would be no conflict.	**Adverse** **Negligible-Minor** Environmental plans/polices would be affected, but there would be no conflict.	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Same as Alternative A
	Alter Character of Community	**Adverse** **Minor** Loss of dairy would be noticeable change, but would not alter the rural character of the community.	**Adverse** **Minor** Loss of dairy would be noticeable change, but would not alter the rural character of the community.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A

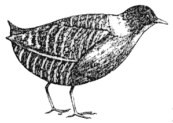


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
General Land Use	*Increase Density Beyond Population Projections*	**No Impact** Population density would not be affected.	**No Impact** Population density would not be affected.	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Induce Substantial Growth Directly or Indirectly	**No Impact** Major or Substantial growth would not be induced either directly or indirectly.	**No Impact** Major or Substantial growth would not be induced either directly or indirectly.	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Displace Existing Housing	**Negligible** Worker housing would be displaced in two areas.	**Negligible** Worker housing would be displaced in two areas.	**Negligible** Same as Alternative A	**Negligible** Same as Alternative A	**Negligible** Same as Alternative A
Agricultural Land Use	*Conflict with GMP Policies on Agriculture or Agricultural Land Uses*	**No Impact** GMP policies regarding agricultural land use would not be affected	**No Impact** GMP policies regarding agricultural land use would not be affected	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Discontinue Agriculture on Parklands or Continue at Level Not Compatible with Natural or Public Access Resources	**Beneficial** **Minor-Moderate** Agricultural management practices incompatible with resource protection would be discontinued or reduced.	**Beneficial** **Major** Agricultural management practices incompatible with resource protection would be discontinued.	**Beneficial** **Major** Same as Alternative A	**Beneficial** **Major** Same as Alternative A	**Beneficial** **Major** Same as Alternative A
	Affect Use of Lands in Agricultural Production Zone	**Adverse** **Negligible-Minor** Giacomini Ranch would be retained as grazing land or converted to open space, an approved conditional use of agricultural lands.	**Adverse** **Minor** Giacomini Ranch would be converted to open space or wildlife refuge, approved conditional uses of agricultural lands.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A
	Conflict with Policies on Agriculture in Coastal Zone	**Adverse** **Negligible-Minor** Conversion would not conflict with Coastal Zone policies, because conversion would occur on wetlands that were not suited to agriculture prior to conversion.	**Adverse** **Negligible-Minor** Conversion would not conflict with Coastal Zone policies, because conversion would occur on wetlands that were not suited to agriculture prior to conversion.	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Same as Alternative A

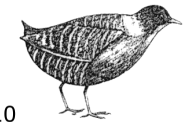


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Agricultural Land Use	*Affect Agricultural or Open Space Contracts*	**Adverse** **Negligible/Minor** Giacomini Ranch would be retained for grazing or converted to open space, an approved/conditional use of contract agricultural lands.	**Adverse** **Negligible/Minor** Giacomini Ranch would be r converted to open space or wildlife refuge, approved/conditional uses of contract agricultural lands.	**Adverse** **Negligible/Minor** Same as Alternative	**Adverse** **Negligible/Minor** Same as Alternative A	**Adverse** **Negligible/Minor** Same as Alternative A
	*Affect Agricultural Resources, Operations, or Adjacent Agricultural Land Uses (**LESA Analysis**)*	**Adverse** **Negligible/Minor** If grazing occurs, impacts considered negligible due to conversion of 11 acres to tidal wetlands. If grazing does not occur, impacts characterized as minor.	**Adverse** **Minor** Based on the LESA analysis, impacts to agricultural resources from conversion of the Giacomini Ranch from grazing to open space or wildlife refuge would be considered minor.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A
Geologic Resources						
	Unique Geologic Resources	**No Impact** There are no unique geologic resources in the Project Area.	**No Impact** There are no unique geologic resources in the Project Area.	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A	**No Impact** Same as Alternative A
	Topographic Resources	**Beneficial** **Negligible** Negligible changes (< 0.25 vertical feet) would occur in ~ 11 acres of Project Area through fill removal.	**Beneficial** **Moderate** Moderate changes (< 0.5 vertical feet) would occur in ~ 53 percent of Project Area through fill removal. Intense excavation would occur in 9 percent of Project Area.	**Beneficial** **Moderate** Moderate changes (< 0.5 vertical feet) would occur in ~ 76 percent of Project Area through fill removal. Intense excavation would occur in 9 percent of Project Area.	**Beneficial** **Moderate** Moderate changes (< 0.25 vertical feet) would occur in ~ 90 percent of Project Area through fill removal. Intense excavation would occur in 16 percent of Project Area.	**Beneficial** **Moderate** Moderate changes (< 0.25 vertical feet) would occur in ~ 91 percent of Project Area through fill removal. Intense excavation would occur in 17 percent of Project Area.
	Geologic Hazards – Surface Fault Rupture and Impacts on Public Safety	**No Impact** No construction of habitable or non-habitable structures would occur within 50 feet of an active fault.	**Adverse** **Minor** Non-habitable facilities -- a Lagunitas Creek bridge -- would be constructed 100-300 feet from an active fault.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**No Impact** No bridge would be constructed over Lagunitas Creek, and no other facilities would be constructed near an active fault.
	Geologic Hazards – Groundshaking and Liquefaction and Impacts on Public Safety	**Adverse** **Negligible** Public safety threats would be negligible, because public access would remain minimal.	**Adverse** **Minor** Despite increasing public access, public safety threats would be minor, as probability of major earthquake low.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A

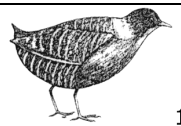


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
	Coastal Bluff Stability	**No Impact** Coastal bluff stability would not be affected.	**Adverse** **Negligible/Minor** Bluffs would not be developed, and invasives removal would not violate bluff-related policies in LCP.	**Adverse** **Negligible/Minor** Same as Alternative A	**Adverse** **Negligible/Minor** Same as Alternative A	**Adverse** **Negligible/Minor** Same as Alternative A
Soil Resources						
	Sediment Nutrients – Project Area *Short-Term*	**Beneficial** **Negligible** Reducing or eliminating agricultural operations would have negligible effects in the short-term as nutrient pools are slow to change.	**Beneficial** **Negligible** Eliminating agricultural operations would have negligible effects in the short-term as nutrient pools are slow to change.	**Beneficial** **Negligible** Same as Alternative A	**Adverse** **Negligible** Reducing water impoundment in Olema Marsh may cause changes in soil chemistry and short-term efflux of nutrients from sediment into waters.	**Adverse** **Negligible** Same as Alternative C
	Long-Term	**Beneficial** **Minor** With reduction or elimination of grazing, nutrient concentrations would decrease, though remain high relative to natural wetlands.	**Beneficial** **Moderate** Elimination of grazing would be expected to cause nutrient levels to drop to those of natural marshes over time, even in West Pasture.	**Beneficial** **Moderate** Nutrients levels would be expected to drop to those of natural marshes, possibly at slightly higher rates compared to Alternative A.	**Beneficial** **Moderate** Pulse of nutrients released from Olema Marsh soils would drop back to those of natural marshes. Effects in Giacomini Ranch same as Alternative B.	**Beneficial** **Moderate** Same as Alternative C
	Sediment Nutrients – Watershed *Short-Term*	**No Impact** Retention of the levees would maintain similar conditions to baseline ones in terms of effect on sediment nutrient dynamics in watershed.	**Beneficial** **Negligible** Levee removal would decrease downstream nutrient transport to Bay sediment through floodplain retention, but decrease would be offset by temporary increase in nutrient efflux from Project Area due to soil disturbance.	**Beneficial** **Negligible** Effects would be very similar to those described in Alternative A, but of slightly greater intensity due to more levee removal and floodplain restoration.	**Beneficial** **Negligible** Effects would be very similar to those described in Alternative B, but of slightly greater intensity due to more levee removal and floodplain restoration, including restoration of Olema Marsh.	**Beneficial** **Negligible** Same as Alternative C
	Long-Term	**Beneficial** **Negligible-Minor** Over time, degradation of the levees would allow increased retention of nutrients and sediments from Lagunitas Creek on Giacomini Ranch	**Beneficial** **Negligible-Minor** Overflow of Lagunitas Creek onto East Pasture floodplains would trap nutrients and sediments and reduce downstream deposition in	**Beneficial** **Negligible-Minor** Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay	**Beneficial** **Negligible-Minor** Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay	**Beneficial** **Negligible-Minor** Same as Alternative C

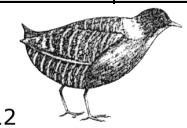


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
		floodplains.	Tomales Bay.	relative to Alternative A.	relative to Alternatives A-B.	
Soil Resources	*Sediment Contaminants – Project Area*	**Adverse** **Negligible** Contaminant concentrations low currently and would change negligibly with restoration of the 11-acre mitigation component or eventual levee degradation.	**Adverse** **Negligible** Limited levee breaching would increase fluvial and tidal influences and might slightly increase exposure of Project Area to contaminants such as mercury.	**Adverse** **Negligible** More extensive levee removal might further increase exposure of Project Area to contaminants such as mercury	**Adverse** **Minor** Realignment of Tomasini Creek into pasture would increase possible contaminant exposure from closed landfill. Restoration of Olema Marsh would have little impact.	**Adverse** **Minor** Same As Alternative C
	Sediment Contaminants – Watershed *Short-Term*	**No Impact** Retention of the levees would maintain similar conditions to baseline ones in terms of effect on watershed contaminant dynamics.	**Beneficial–Negligible** Limited levee removal in the East Pasture would trap upstream contaminants on restored floodplain and reduce deposition in Tomales Bay.	**Beneficial –Negligible** Effects would be very similar to those described in Alternative A, but of greater magnitude due to more levee removal and restoration of floodplain.	**Beneficial – Negligible** Effects similar to those of Alternative B, but of greater intensity due to more levee removal and floodplain restoration, including Olema Marsh restoration.	**Beneficial – Negligible** Same as Alternative C
	Long-Term	**Beneficial** **Negligible** Over time, levee degradation would allow increased contaminant retention on Giacomini Ranch floodplains and reduce deposition in Bay.	**Beneficial** **Negligible** Overflow of Lagunitas Creek onto East Pasture floodplains would trap contaminants and reduce downstream deposition in Bay.	**Beneficial** **Negligible** Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay relative to Alternative A.	**Beneficial** **Negligible** Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay relative to Alternatives A-B.	**Beneficial** **Negligible** Same as Alternative C
Air Resources						
Air Quality	*Air Pollutants-Construction Emissions*	**Adverse** **Negligible** Construction would be limited in scope and duration, so emissions would be negligible.	**Adverse** **Negligible**/Moderate NOX emissions from construction in first construction season may cause moderate impacts to air quality, with other emissions having negligible effects.	**Adverse** **Negligible**/Minor NOX emissions from construction in both construction seasons may cause minor impacts. Other emissions would have negligible effects.	**Adverse** **Negligible**/Moderate Construction in both construction seasons may cause moderate NOX emissions impacts, as well as minor CO impacts.	**Adverse** **Negligible**/Major or Substantial/Significant NOX emissions from construction would cause moderate impacts in first construction season and major impacts in second one. CO impacts would be minor both seasons.
	NEPA: Intensity Following Mitigation					***Adverse*** ***Moderate*** Mitigation measures -- limiting number of concurrently

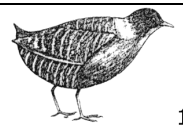


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Air Quality	*NEPA: Intensity Following Mitigation (cont.)*					operating machines, reducing idling – would reduce NOX impacts to moderate.
	CEQA: Significance Following Mitigation					***Adverse*** ***Less than Significant*** Mitigation measures -- limiting number of concurrently operating machines, reducing idling – would reduce NOX impacts to less than significant under CEQA.
	Air Pollutants – Project-Generated Carbon Monoxide Emissions	**Adverse** **Negligible** Visitor and resident vehicles would be only source of CO, and visitation-related traffic would not be expected to exceed 33 vehicles/hour.	**Adverse** **Minor** Visitor and resident vehicles would be only source of CO. Visitation-related traffic would be expected to exceed 33 vehicles/hour, but not 66 vehicles/hour.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Negligible** Visitor and resident vehicles would be only source of CO. A decrease in public access facilities would decrease visitation-related traffic relative to Alternative B, so vehicles/ hour not would not be expected to exceed 33.	**Adverse** **Negligible** Same as Alternative C
	Air Pollutants – Project-Generated Total Emissions	**Adverse** **Negligible** Visitor and resident vehicles would be only source of emissions, and visitation-related traffic would not be expected to exceed 1,000 vehicles/ day.	**Adverse** **Negligible** Visitor and resident vehicles would be only source of emissions, and visitation-related traffic would not be expected to exceed 1,000 vehicles/ day.	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A
	Odors *Construction/ Short-Term*	**Beneficial** **Minor** Manure and other dairy odors would be reduced with discontinuation of the dairy.	**Adverse** **Negligible** Excavation of wetland and manured soils could result in temporary bad odors, however, close of the dairy would eliminate dairy odors and slightly offset impacts.	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Moderate** In addition to odors generated by excavation in Giacomini Ranch, restoration of Olema Marsh could also produce temporary bad odors.	**Adverse** **Moderate** Same as Alternative C
	Long-Term	**Beneficial** **Minor** Same as Construction/	**Beneficial** **Minor** Once restoration-related	**Beneficial** **Minor** Same as Alternative A	**Beneficial** **Minor** Same as Alternative A	**Beneficial** **Minor** Same as Alternative A

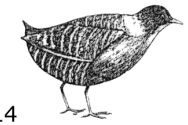


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Air Quality	*Odors* *Long-Term*	Short-Term	odors fade, an overall improvement in odor would occur with close of the dairy.			
Noise and Soundscapes	*Construction-Related Effects (Roadway/ Earthmoving)*	**Adverse** **Negligible-Minor** Construction equipment on roadways would be expected to have a negligible impact (<3 dBA) on noise in Point Reyes Station and Inverness Park, but a minor (~4 dBA) impact may occur on Pierce Point Road.	**Adverse** **Negligible-Major or Substantial/Significant** Noise impacts from hauling would be similar to No Action Alternative. Earthmoving would generate major or substantial temporary increases in noise for residents at southern end of East Pasture (up to 86 dBA) and southern end of West Pasture (up to 75 dBA).	**Adverse** **Negligible-Major or Substantial/Significant** Same intensity as Alternative A, except duration of roadway hauling and earthmoving would be longer.	**Adverse** **Negligible-Major or Substantial/Significant** Same intensity as Alternative B, except duration of roadway hauling and earthmoving would be longer.	**Adverse** **Negligible-Major or Substantial/Significant** Same intensity as Alternative C, except duration of roadway hauling and earthmoving would be longer.
	NEPA: Intensity Following Mitigation		***Adverse*** ***Moderate*** Mitigation measures – limiting number of concurrently operating machines, notifying residents in advance – would reduce impacts to moderate.	***Adverse*** ***Moderate*** Same as Alternative A	***Adverse*** ***Moderate*** Same as Alternative A	***Adverse*** ***Moderate*** Same as Alternative A
	CEQA: Significance Following Mitigation		***Adverse*** ***Less than Significant*** Mitigation measures – limiting number of concurrently operating machines, notifying residents in advance – would reduce impacts to less than significant.	***Adverse*** ***Less than Significant*** Same as Alternative A	***Adverse*** ***Less than Significant*** Same as Alternative A	***Adverse*** ***Less than Significant*** Same as Alternative A
	Project-Related Effects	**Beneficial** **Minor** A slight decrease in overall ambient noise would result from elimination of noise associated with dairy operations.	**Adverse** **Minor** Noise from dairy operations would cease, but a slight increase in ambient noise would result from increases in visitation-related traffic. Levels would be below limits of 60	**Adverse** **Minor** Same as Alternative A	**Adverse** **Negligible** Noise impacts from visitation-related traffic would be similar to Alternatives A-B, but would be slightly reduced because of the reduced volume of visitation-related traffic	**Beneficial** **Negligible** Noise impacts from visitation-related traffic would be further reduced from Alternative C because of scaling back of public access and would be entirely offset by elimination of

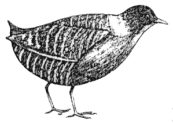


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Noise and Soundscapes	*Project-Related Effects*		dBA-Ldn set by County noise ordinance.		expected.	noise associated with dairy operations.
Water Resources						
Hydraulics and Hydrologic Processes	*Surface Tidal Hydrologic Processes*	**Beneficial** **Negligible** The wetland mitigation component would slightly increase number of tidally influenced acres slightly (10 acres).	**Beneficial** **Moderate** Approximately 199 acres or 34 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.	**Beneficial** **Moderate** Approximately 210 acres or 36 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.	**Beneficial** **Moderate** Approximately 213 acres or 36 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.	**Beneficial** **Moderate** Approximately 206 acres or 39 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.
	Surface Freshwater Hydrologic Processes *(Project Area/ Watershed)*	**Beneficial** **Minor/ Negligible** The discontinuation of intensive agricultural management would have minor beneficial effects on freshwater processes in the Project Area, but negligible effects for watershed.	**Beneficial** **Minor/ Minor** Freshwater processes in the Project Area and watershed would measurably benefit from discontinuation of intensive agricultural management and removal of agricultural infrastructure, including breaching of East Pasture levee.	**Beneficial** **Moderate/ Minor** Freshwater processes in Project Area would appreciably benefit from discontinuation of intensive management and expanded infrastructure removal, such as levee breaching in West Pasture, but benefits would remain minor for watershed.	**Beneficial** **Moderate/ Moderate** Impacts on the freshwater hydrologic processes in the Project Area would be similar to Alternative B, with slight improvement due to complete removal of all levees. Benefits for watershed would increase considerably.	**Beneficial** **Moderate/ Moderate** Impacts on freshwater hydrologic processes would be similar to Alternative C, with some improvement from additional restoration actions.
	Hydrologic Functions – Floodplains and Floodwater Retention	**Beneficial** **Negligible** Over short-term, negligible change in floodwater retention would occur because levees would not be removed, except for 11-acre mitigation component. Overbank flooding would occur only ≥ 3.5-year flood events.	**Beneficial** **Moderate** Floodwater retention would increase appreciably with breaching of East Pasture levee, increasing frequency of overbank flooding to 2-year flood events and decreasing Lagunitas Creek floodwater volume by 10 percent.	**Beneficial** **Major** Floodwater retention would increase substantially with expanded levee removal, increasing frequency of overbank flooding to 2-year flood events in both pastures and decreasing Lagunitas Creek floodwater volume by 19 percent.	**Beneficial** **Major** Floodwater retention would increase substantially with expanded levee removal, decreasing Lagunitas Creek floodwater volume by 20 percent. Lowered static water levels would also increase retention potential in Olema Marsh.	**Beneficial** **Major** Impacts would be similar to Alternative C, with some slight improvement in flood water retention from additional restoration actions.
	Hydrologic Processes – Sediment Transport *(Project Area/ Watershed)*	**Beneficial** **Negligible/ Negligible** During 2-year flood events, only 11-acre mitigation component would have potential for retaining floodwater-associated	**Beneficial** **Major/ Minor** Breaching of East Pasture levees could divert up to 10 percent of floodwater-associated suspended sediment during ~2-year	**Beneficial** **Major/ Moderate** Levee removal in East and West Pastures could divert up to 19 percent of floodwater-associated suspended sediment during ~2-year flood	**Beneficial** **Major/ Moderate** Effects would be similar to Alternative B, but up to 20 percent of floodwater-associated of suspended sediment during~ 2-year	**Beneficial** **Major/ Moderate** Same as Alternative C

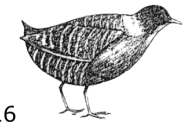


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Hydraulics and Hydrologic Processes	*Sediment Transport (Cont).*	sediment and therefore barely detectable effect on transport in Project Area or watershed.	event onto floodplains, a major benefit for Project Area and minor one for watershed.	event onto floodplains, a major benefit for Project Area, but minor for watershed.	event could be diverted.	
Water Quality	*Construction (Project Area/ Watershed)*	**Adverse** **Negligible/ Negligible** Levee removal and other activities during construction of 11-acre wetland mitigation component could cause some sediment fallback into Lagunitas Creek. Would have negligible effects in Project Area and watershed.	**Adverse** **Negligible/ Negligible** Construction activities would have barely detectable effects on water quality in Project Area and watershed, because of implementation of Best Management Practice mitigation measures.	**Adverse** **Negligible/ Negligible** Same as Alternative A	**Adverse** **Negligible/ Negligible** Same as Alternative A	**Adverse** **Negligible/ Negligible** Same as Alternative A
	Short-Term	**Beneficial** **Negligible/ Negligible** Discontinuation of intensive agricultural management would have negligible beneficial effect over short-term because of slow rate of decrease expected in pool of nutrients, pathogens, and potential sources in Project Area water bodies. Because of lack of hydrologic connection, this would result in negligible improvements in downstream water quality.	**Beneficial** **Minor/ Negligible** Discontinuation of intensive agricultural management would have beneficial effects over short-term by reducing nutrients and pathogens and stagnant water conditions. Approximately 10 percent of floodwaters transporting pollutants would overbank flood into East Pasture during ~2-year flood event, however, short-term vegetation changes could cause nutrient pulse to downstream waters.	**Beneficial** **Minor/ Negligible** Effects would be similar to those described under Alternative A, but both East and West Pastures would be hydrologically reconnected to Lagunitas Creek, thereby improving overall water quality relative to baseline conditions. This would have measurable benefits over the short-term for Project Area waters, but watershed effects would remain negligible.	**Beneficial** **Negligible/ Minor** Minor benefits from Giacomini Ranch would be offset by temporary adverse effects from lowering water levels in Olema Marsh and subsequent water quality problems expected with oxidation and decomposition of peat soils. Would reduce Project Area benefits to negligible. Realignment of Tomasini Creek into East Pasture would boost short-term benefits for watershed to minor.	**Beneficial** **Negligible/ Minor** Same as Alternative C
	Long-Term	**Beneficial** **Minor/ Negligible** Discontinuation of intensive agricultural management would have measurable beneficial effect, because pool of nutrients, pathogens, and potential sources in Project Area water bodies would slowly decrease. Because of lack of hydrologic connection,	**Beneficial** **Moderate/ Minor** Discontinuation of intensive management and restoration would have appreciable beneficial effects by reducing nutrients, pathogens, sources, and stagnant conditions. Approximately 10 percent of floodwaters transporting pollutants would flood into	**Beneficial** **Moderate/ Moderate** Impacts would be similar to Alternative A, but of greater intensity due to increased infrastructure removal and restoration in both West and East Pastures. Approximately 18 percent of floodwaters transporting pollutants would overbank flood into East	**Beneficial** **Major/ Moderate** Realignment of Tomasini Creek and restoration of Olema Marsh would further increase benefits to the Project Area relative to Alternatives A-B, raising them to Major, while these same actions would also slightly increase benefits to the	**Beneficial** **Major/ Moderate** Same as Alternative C

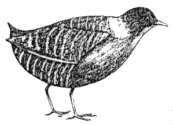


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Water Quality	*Long-Term*	this would result in negligible improvements in downstream water quality.	East Pasture during ~2-year flood event, decreasing downstream transport.	Pasture during ~2-year flood event, decreasing downstream transport.	watershed.	
Vegetation Resources						
Vegetation Resources	*Native Vegetation Communities* *Short-Term*	**Beneficial** **Negligible** Certain native vegetation communities would expand in response to discontinuation of intensive agricultural management, but reduction in or elimination of grazing would cause sharp increase in weedy, opportunistic species within most areas that would slightly offset these benefits.	**Beneficial** **Negligible** Certain native vegetation communities would expand in response to discontinuation of intensive management and levee breaching, but elimination of grazing would cause a sharp increase in weedy, opportunistic species within most areas that would slightly offset these benefits.	**Beneficial** **Negligible** Same as Alternative A	**Adverse** **Minor** Lowering water levels in Olema Marsh would cause extensive die-back of existing vegetation as marsh adjusts to changes in water levels and salinity, potentially promoting establishment by weedy, opportunistic species. Overall, this would result in a measurable adverse effect over short-term.	**Adverse** **Minor** Similar to Alternative C.
	Long-Term	**Beneficial** **Minor** Native-dominated communities would increase 11 percent, once vegetation fully responds to discontinuation of management and establishes in mitigation component area.	**Beneficial** **Moderate** Native-dominated communities would increase ~30 percent, mostly due to conversion of pastures into salt and brackish marshes typically characterized by fewer invasive species.	**Beneficial** **Major** Native-dominated communities would increase ~70 percent, mostly due to conversion of pastures into salt and brackish marshes typically characterized by fewer invasive species.	**Beneficial** **Major** Extent of native vegetation in the East and West Pastures would be very similar to Alternative B. Olema Marsh would become dominated by native species again once conditions stabilized.	**Beneficial** **Major** Native-dominated communities would increase slightly relative to Alternative C due to excavation in East Pasture.
	Wetlands *Construction/ Temporary*	**Adverse** **Negligible** Construction of 11-acre mitigation component would cause barely detectable adverse effects from temporary stockpiling.	**Adverse** **Moderate** There would be 0.25 – 1.0 acres of temporary impacts during implementation from construction of eastern perimeter trail and from temporary stockpiling.	**Adverse** **Moderate** There would be 0.25 – 1.0 acres of temporary impacts during implementation from construction of eastern perimeter trail and from temporary stockpiling.	**Adverse** **Moderate** There would be 0.25 – 1.0 acres of temporary impacts during construction from temporary stockpiling.	**Adverse** **Moderate** There would be 0.25 – 1.0 acres of temporary impacts during construction from temporary stockpiling.
	Wetlands *Short-Term/ Long-Term*	**Beneficial** **Minor** The wetland mitigation component would result in a	**Beneficial** **Major** Loss of 0.27 acre of wetland from construction of eastern	**Beneficial** **Major** Loss of 1.74 acres of wetland from construction of high tide	**Beneficial** **Major** Loss of 1.74 acres of wetland from construction of high tide	**Beneficial** **Major** Loss of 1.82 acres of wetland from construction of high tide

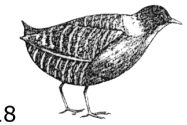


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Vegetation Resources	*Wetlands* *Short-Term/ Long-Term*	minor net gain of 0.4 acres of wetlands.	perimeter trail would be offset by passive and active restoration, resulting in a net gain of ~9 acres.	refugia would be offset by passive and active restoration, resulting in a net gain of ~14 acres.	refugia would be offset by passive and active restoration, resulting in a net gain of ~19 acres.	refugias would be offset by passive and active restoration, resulting in a net gain of ~26 acres.
	Riparian and Bluff Habitat *Construction/ Temporary*	**No Impact** There would be no temporary impacts to riparian habitat.	**Adverse** **Major** There would be 0.54 acre of permanent and 0.34 acre of temporary impact to riparian habitat from eastern perimeter trail construction. Conflicts with LCP Streamside Conservation Area and Point Reyes Station Community Plan Mesa Bluff policies.	**Adverse** **Major** Same as Alternative A.	**No Impact** There would be no temporary impacts to riparian habitat unless southern perimeter trail extended to Inverness Park by expanding Sir Francis Drake road berm.	**No Impact** Same as Alternative C
	NEPA: Intensity Following Mitigation		**Moderate** Impacts would be reduced to moderate through passive and active restoration of riparian in other SCAs for net gain of 2.5 acres.	**Minor** Impacts would be reduced to minor through passive and active restoration of riparian in Tomasini and other SCAs for net gain of 3.2 acres.		
	CEQA: Significance Following Mitigation		**Less than Significant** Impacts would be reduced to less than significant through passive and active restoration of riparian in other SCAs (Lagunitas, Fish Hatchery) for net gain of 2.5 acres.	**Less than Significant** Impacts would be reduced to less than significant through passive and active restoration of riparian in Tomasini and other SCAs for net gain of 3.2 acres.		
	Short-Term/ Long-Term	**Beneficial** **Negligible** An increase of less than 0.5 acres in the areal extent of riparian habitat would occur along creeks in Project Area with discontinuation of intensive agricultural management and reduced or eliminated grazing.	**Beneficial** **Moderate** Loss of 0.54 acres of riparian habitat would be offset by net increase of 2.5 acres from discontinuation of intensive agricultural management practices and active restoration and revegetation.	**Beneficial** **Major** Loss of 0.54 acres of riparian habitat would be offset by net increase of 10 acres from discontinuation of intensive agricultural management practices and active restoration and revegetation.	**Beneficial** **Major** Loss of 0.1 acre of riparian habitat would offset by net increase of 11.6 acres from discontinuation of intensive agricultural management and active restoration and revegetation.	**Beneficial** **Major** There would be no loss of riparian habitat. An increase of 11.8 acres would occur with discontinuation of intensive agricultural management and active restoration and revegetation.

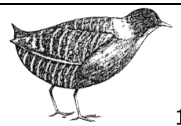


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Vegetation Resources	*Special Status Plant Species* *Construction*	**Adverse** **Minor** Levee removal and quarry hauling could have minor impact on rare plant occurrences. Construction would impact less than a third of the reproduction season.	**Adverse** **Minor** Levee removal and quarry hauling could have minor impact on rare plant occurrences. Construction would impact less than a third of the reproduction season.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A
	Long-Term	**Beneficial** **Minor** There would be an 11-acre increase in special status species habitat. This would potentially have a measurable effect on Project Area distribution of species, but not on regional distribution.	**Beneficial** **Major** There would be more than a 300-acre increase in special status species habitat. This would potentially have a substantial effect on Project Area distribution of species and an appreciable effect on regional distribution.	**Beneficial** **Major** There would be an ~ 350 acre increase in special status species habitat. This would potentially have a substantial effect on Project Area distribution of species and an appreciable effect on regional distribution.	**Beneficial** **Major** Same as Alternative B	**Beneficial** **Major** Same as Alternative B
	Invasive Plant Species *Short-Term/ Long-Term*	**Beneficial** **Negligible** Removal of invasive species would result in a 1.3 percent decrease in areal extent of non-native invasive species.	**Beneficial** **Minor** Removal of invasive species would result in a 16 percent decrease in areal extent of non-native invasive species.	**Beneficial** **Moderate** Removal of invasive species would result in a 30 percent decrease in areal extent of non-native invasive species.	**Beneficial** **Moderate** Removal of invasive species would result in a 35 percent decrease in areal extent of non-native invasive species	**Beneficial** **Moderate** Removal of invasive species would result in a 38 percent decrease in areal extent of non-native invasive species.
Fish and Wildlife Resources						
	High Value Wildlife Habitats *Construction*	**Adverse** **Negligible** Construction would occur in only in 11-acre portion of East Pasture. It would cause no or negligible impact to extent or condition of high value wildlife habitats in Giacomini Ranch.	**Adverse** **Negligible** Impacts during construction in East Pasture such as filling of ditches and incidental fallback of sediment into creek would affect less than 5 percent of high value wildlife habitats in Project Area.	**Adverse** **Minor** Impacts during construction in East and West Pastures such as filling of ditches and incidental fallback of sediment into creek would affect less than 5 -10 percent of high value wildlife habitats in Project Area.	**Adverse** **Minor** Even with addition of Olema Marsh, impacts during construction such as filling of ditches, channel excavation,, and incidental fallback of sediment into creek would affect less than 5 -10 percent of high value wildlife habitats in Project Area.	**Adverse** **Minor** Same as Alternative C

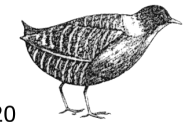


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Fish and Wildlife Resources	*High Value Wildlife Habitats*					
	Short-Term	**Adverse** **Negligible** Discontinuation of intensive agricultural management would cause sharp increase in weedy, opportunistic species that would have a slight adverse effect on areal extent of high value wildlife habitats (<5%) over short-term.	**Adverse** **Negligible** Discontinuation of intensive management and conversion of pasture to marsh in East Pasture would cause sharp increase in weedy, opportunistic species that would have a slight adverse effect on areal extent of high value wildlife habitats (<5%) over short-term.	**Adverse** **Negligible** Discontinuation of intensive management and conversion of pasture to marsh in East and West Pastures would cause sharp increase in weedy, opportunistic species that would have a slight adverse effect on areal extent of high value wildlife habitats (<5%) over short-term.	**Adverse** **Moderate** Adverse effects in Giacomini Ranch would be slightly less than Alternative B, because of expanded revegetation. Extensive dieback of Olema Marsh vegetation in response to lowered water levels and increased tidal influence would cause short-term impacts to high value habitat, increasing overall intensity to moderate (10-25%).	**Adverse** **Moderate** Same as Alternative C
	Long-Term	**Beneficial** **Minor** There would be ~6 percent increase in areal extent of high value wildlife habitats -- such as riparian and tidal salt marsh -- in Project Area.	**Beneficial** **Moderate** There would be more than 10 percent increase in areal extent of high value wildlife habitats in Project Area.	**Beneficial** **Major** There would be more than 40 percent increase in areal extent of high value wildlife habitats in Project Area.	**Beneficial** **Major** There would be more than 43 percent increase in areal extent of high value wildlife habitats in Project Area.	**Beneficial** **Major** There would be more than 46 percent increase in areal extent of high value wildlife habitats in Project Area.
	Changes in Wildlife Use					
	Construction	**Adverse** **Negligible** Reconnection of East Pasture Old Slough during construction of mitigation component could have negligible adverse effects on wildlife use (< 5%).	**Adverse** **Negligible** Construction noise, filling of ditches, and incidental fallback of sediment into creek during restoration of East Pasture could cause negligible adverse effects on wildlife use (< 5%).	**Adverse** **Minor** More extensive construction in West and East Pastures and associated noise and temporary and permanent habitat impacts could cause negligible adverse effects on wildlife use (5-10%).	**Adverse** **Minor** Effects would be very similar to Alternative B, but minor dredging of Bear Valley Creek in Olema Marsh could increase impacts to wildlife use slightly, however, still minor overall (5-10%).	**Adverse** **Minor** Same as Alternative C
	Short-Term	**Beneficial** **Negligible** As riparian habitat rapidly expands, wildlife use of Project Area would be expected to increase slightly. Effects would remain negligible due to conversion of pasture to ruderal grassland.	**Beneficial** **Negligible** Discontinuation of agricultural management and breaching of East Pasture levee would rapidly increase some high value wildlife habitats along perimeter, but most areas would undergo transitional phase during conversion	**Beneficial** **Negligible** Effects would be similar to Alternative A, except that they would be expanded to encompass the West Pasture with breaching of its levee.	**Adverse** **Minor** Effects in Giacomini Ranch would be similar to Alternative B, but extensive dieback of Olema Marsh vegetation and temporary water quality problems associated with lowered water levels would have more effect on wildlife	**Adverse** **Minor** Same as Alternative C

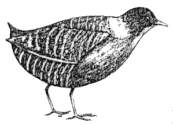


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
	Changes in Wildlife Use Short-Term		characterized by weedy, opportunistic plant species.		use over short-term, causing overall intensity to become minor (5-10%).	
	Long-Term	**Beneficial** **Negligible** Increase in riparian and marsh and meadow habitats along perimeter would be expected to cause slight increase in wildlife use of Project Area (~3 percent increase).	**Beneficial** **Minor** Increase in riparian, tidal channel, and salt marsh habitats in East Pasture and, to a lesser degree, West Pasture would cause measurable increase in wildlife use of Project Area (5-10%).	**Beneficial** **Moderate** Increase in riparian, tidal channel, and salt marsh habitats relative to Alternative A because of East and West Pasture restoration would cause appreciable increase in wildlife use of Project Area (10-25%).	**Beneficial** **Moderate** Effects in Giacomini Ranch would be similar to Alternative B, but reestablishment of freshwater and brackish marsh in Olema Marsh would slightly increase wildlife use, although intensity would remain moderate (10-25%).	**Beneficial** **Moderate** Same as Alternative C
Fish and Wildlife Resources	*Invasive Wildlife Species* *Short-Term/ Long-Term*	**Adverse** **Negligible** The 11-acre mitigation component could cause a barely detectable increase (<10%) in number of estuarine invasive species present in Project Area.	**Adverse** **Minor** Non-native wildlife already present would remain with possible minor expansion (10-25%) in abundance or occurrence of some aquatic invasives in new tidal areas.	**Adverse** **Minor** Effects would be similar to Alternative A, but with slight increase in estuarine invasives in West Pasture because of levee breaches and tidegate removal.	**Adverse** **Minor** Effects would be similar to Alternative B in Giacomini Ranch, but with slight increase of aquatic invasives in Olema Marsh due to increased tidal influence.	**Adverse** **Minor** Same as Alternative C
	Wildlife Conditions in the Watershed *Short-Term*	**Beneficial** **Negligible** Discontinuation of intensive agricultural management would cause barely detectable benefits to downstream habitat conditions, but there would be no detectable effect during transitional phase on food resource conditions or species assemblages in southern Tomales Bay.	**Beneficial** **Negligible** Discontinuation of intensive agricultural management and restoration of tidal connectivity would cause some benefits to downstream habitat conditions, but there would be no detectable effect during transitional phase on food resource conditions or species assemblages in southern Tomales Bay.	**Beneficial** **Negligible** Effects would be very similar to Alternative A, except that tidal connectivity would be restored in West and East Pastures. The ruderal-dominated transitional phase in vegetation, as well as lag expected for establishment of estuarine species assemblages, would generate negligible benefits for watershed wildlife species over short-term.	**Beneficial** **Negligible** Effects would be very similar to Alternative B, except that tidal connectivity would be reestablished for Olema Marsh. The extensive dieback of vegetation as the marsh adjusts to lowered water levels and increased tidal influence could slightly increase carbon export, although the marsh would offer less foraging benefits.	**Beneficial** **Negligible** Same as Alternative C

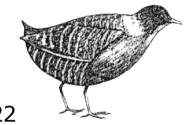


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Fish and Wildlife Resources	*Wildlife Conditions in the Watershed* *Long-Term*	**Beneficial** **Negligible** Long-term effects would be similar to short-term ones, although there is potential for increased benefits to watershed if levee degradation eventually occurs and improves hydrologic connectivity.	**Beneficial** **Minor** Establishment of fully functioning marsh in East Pasture with appropriate flora and fauna would increase benefits to wildlife in the watershed relative to short-term effects by increasing potential for export of carbon to Bay and the availability of food sources and prey for non-resident species.	**Beneficial** **Moderate** Effects for wildlife in watershed would be similar to Alternative A, but of greater intensity due to restoration of tidal and floodplain connectivity for West and East Pastures.	**Beneficial** **Moderate** Effects for wildlife in watershed would be similar to Alternative B, but of slightly greater intensity due to increased potential for carbon export and access by non-resident species to Tomasini Creek and restored Olema Marsh once it has adjusted to lowered water levels and increased tidal influence.	**Beneficial** **Moderate** Same as Alternative C
	California Red-legged Frog *Construction*	**Adverse** **Negligible** Impacts from construction of the 11-acre wetland mitigation component would be expected to be non-existent or negligible, because no breeding has been documented in East Pasture, and construction would occur outside breeding season. .	**Adverse** **Negligible** Impacts from construction of the East Pasture component would be expected to be non-existent or negligible, because no breeding has been documented in East Pasture.	**Adverse** **Minor** Impacts from construction in West and East Pastures would be potentially measurable, because breeding occurs in West Pasture. Construction would not directly impact breeding habitat and would be conducted largely after breeding season.	**Adverse** **Minor** Effects in Giacomini Ranch would be very similar to Alternative B, but very minor excavation in Olema Marsh could slightly increase impacts during construction, although intensity would remain minor.	**Adverse** **Minor** Same as Alternative C
	Short-Term	**Adverse** **Negligible** Ongoing conversion of a portion of primary breeding habitat in West Pasture from freshwater to brackish marsh would be expected to continue and therefore have measurable adverse effects relative to baseline conditions. There would be no or only negligible change in Olema Marsh. Overall, conversion would result in only negligible adverse effect on breeding	**Adverse** **Negligible** Same as the No Action Alternative, because no restoration would be conducted in West Pasture or Olema Marsh.	**Adverse** **Moderate** While freshwater marsh would be created in East Pasture to offset additional impacts of increased tidal influence in West Pasture freshwater marsh relative to Alternative A, appropriate conditions for breeding would be expected to take time to develop, leading to appreciable adverse impacts over short-term in Project Area and measurable adverse effects	**Adverse** **Moderate** Effects in Giacomini Ranch would be very similar to Alternative B. Extensive dieback of vegetation and temporary water quality problems in Olema Marsh would increase short-term impacts to breeding habitat, however, they would be offset to some degree by creation of breeding ponds adjacent to Olema Creek. Overall, intensity of impact would	**Adverse** **Moderate** Same as Alternative C

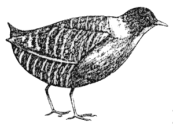


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Fish and Wildlife Resources	*California Red-Legged Frog*	habitat units and distribution of species in Core Area.		on breeding habitat units in Core Area.	remain moderate.	
	Long-Term	**Adverse** **Minor** Impacts to breeding habitat could possibly become measurable over time, because levee degradation would increase tidal influence in the West Pasture.	**Adverse** **Minor** Same as No Action Alternative	**Adverse** **Negligible** Over time, appropriate conditions for breeding would develop in created freshwater marsh in East Pasture. Would still have a measurable effect on distribution of species in Project Area, because primary breeding habitat would be shifted from the West Pasture to the East Pasture, where breeding has not been documented. However, the effect on distribution and breeding habitat units in Core Area would be barely detectable.	**Adverse** **Minor** Effects in Giacomini Ranch would be very similar to Alternative B. Impacts to breeding habitat in Olema Marsh would decrease as large proportion (but not all) of freshwater marsh reestablishes within Olema Marsh, and mitigation habitats in East Pasture and Olema Creek become established. Would still have appreciable effects on species distribution within Project Area, because breeding habitats would be at least partially shifted to areas where breeding not previously documented.	**Adverse** **Minor** Effects would be very similar to Alternative C. Complete realignment of Tomasini Creek through created freshwater marsh in East Pasture would only slightly decrease habitat size (0.2 acres) and could increase available non-breeding habitat in immediate vicinity.
	Tidewater Goby					
	Construction	**Adverse** **Moderate** Impacts during construction would be expected to be minor to moderate at most, with implementation of mitigation measures to reduce potential or amount of incidental take from tidal reconnection of documented habitat in the East Pasture Old Slough.	**Adverse** **Moderate** Effects would be very similar to the No Action Alternative, except that the East Pasture Old Slough would be excavated in areas, as well as tidally reconnected. Implementation of mitigation measures would maintain intensity of impacts at moderate.	**Adverse** **Moderate** Effects would be very similar to Alternative A. Restoration of West Pasture could cause indirect impacts during construction to documented habitat. However, impacts still expected to remain moderate overall.	**Adverse** **Moderate** Effects would be very similar to Alternative B. Reconnection of Tomasini Creek to East Pasture Old Slough at Giacomini Hunt Lodge may cause additional negligible adverse impacts, but overall intensity still expected to remain moderate.	**Adverse** **Moderate** Effects would be very similar to Alternative C. Tomasini Creek would be reconnected to East Pasture Old Slough upstream of currently documented habitat. Overall intensity still expected to remain moderate.
	Short-Term	**Beneficial** **Negligible** Discontinuation of intensive agricultural management would slightly increase quality of existing habitat.	**Beneficial** **Minor** Discontinuation of intensive agricultural management and reconnection and creation of tidal channels in the East	**Beneficial** **Moderate** Discontinuation of intensive agricultural management and reconnection and/or creation of tidal channels in the West	**Adverse** **Moderate** While the same beneficial effects would occur as under Alternative B, partial realignment of goby's primary	**Adverse** **Moderate** Effects would be very similar to Alternative C. Tomasini Creek, goby's primary habitat in Project Area, would be

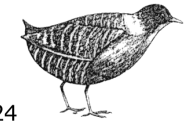


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Fish and Wildlife Resources	*Tidwater Goby* *Short-Term (Cont.)*		Pasture would be expected to increase the quality of existing habitats and to create new habitats, resulting in measurable beneficial effects.	and East Pastures would be expected to increase the quality of existing habitats and to create new habitats, resulting in appreciable beneficial effects.	habitat in Project Area, Tomasini Creek, could adversely affect species over the short-term by converting existing leveed channel into backwater slough with decreased freshwater inflow. Potential risk increases intensity of effects to moderate adverse.	completely realigned into one of its historic alignments. Intensity of effect expected to remain moderate.
	Long-Term	**Beneficial** **Moderate** Slow decay or sudden breaching of levees could increase benefits by considerably increasing amount of available habitat.	**Beneficial** **Moderate** Over time, benefits to goby in East Pasture would increase relative to short-term conditions due to natural expansion of tidal channels and further improvement in quality of existing and created habitat conditions through eventual establishment of prey assemblages.	**Beneficial** **Major** Over time, benefits to goby in West and East Pastures would increase relative to short-term due to natural expansion of tidal channels and further improvement in quality of existing and created habitat conditions through eventual establishment of prey assemblages.	**Beneficial** **Major** Effects would be similar to Alternative B. Expansion of habitat in East Pasture would eventually offset habitat loss from partial realignment of Tomasini Creek. Improved hydraulic connectivity and increased tidal influence in Olema Marsh could increase potential for expansion.	**Beneficial** **Major** Same as Alternative C
	Salmonids *Construction-Related Effects*	**Adverse** **Negligible** Construction of 11-acre mitigation component would have only negligible adverse effects on salmonids associated with potential incidental fallback of sediment into creek during levee removal. Would not take place until end of typical period for smolt outmigration.	**Adverse** **Negligible** Construction would have potential for slight adverse impacts associated with removal of levees along Lagunitas Creek, but would not take place until end of typical period for smolt outmigration.	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A
	Passage and Rearing Conditions	**Beneficial** **Negligible** Discontinuation of intensive agricultural management such	**Beneficial** **Minor** Discontinuation of intensive agricultural management,	**Beneficial** **Moderate** Effects would be very similar to Alternative A, except that	**Beneficial** **Major** Effects would be very similar to Alternative B. Additional	**Beneficial** **Major** Same as Alternative C

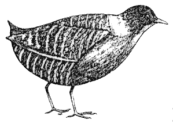


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
	Salmonids *Passage and Rearing Conditions (Cont.).*	as diversion of water from Lagunitas Creek for irrigation, levee maintenance, and crossing of creek by cattle would slightly benefit passage and rearing conditions.	along with removal of hydrologic control infrastructure in East Pasture, would have measurable benefits on passage and rearing conditions by increasing the quality of habitat in Lagunitas Creek and extent of rearing/refugia habitat in Project Area.	extent of created potential refugia/rearing habitat in East Pasture would increase, and salmonids could freely access existing habitat on Fish Hatchery Creek and associated tidal channels in the West Pasture. Would result in appreciable benefits to passage/rearing conditions.	benefits to passage and rearing conditions would come from reduction of passage and rearing constraints on Bear Valley Creek and partial realignment of Tomasini Creek.	
Fish and Wildlife Resources	*Rearing Habitat Extent* *Short-Term*	**Beneficial** **Negligible** Slight increase in potential rearing habitat would occur with partial reconnection of East Pasture Old Slough Pond to Lagunitas Creek. Aquatic edge in Project Area would increase by ~3 percent.	**Beneficial** **Minor** Measurable increase in potential rearing habitat would occur with reconnection of East Pasture Old Slough and creation of additional tidal channels to Lagunitas Creek. Aquatic edge in Project Area would increase by ~13 percent.	**Beneficial** **Minor** Effects would be very similar to Alternative A, except that Fish Hatchery Creek and associated channels would be hydrologically reconnected to undiked portion of creek and would thereby slightly increase the extent of rearing habitat. Aquatic edge in Project Area would increase by ~28 percent.	**Beneficial** **Moderate** Effects would be very similar to Alternative C. Improved hydraulic connectivity in Olema Marsh with Lagunitas Creek, partial realignment of Tomasini Creek, and expanded tidal channel creation in East Pasture would increase extent of rearing habitat appreciably. Aquatic edge in Project Area would increase by ~31 percent.	**Beneficial** **Moderate** While generally very similar to Alternative C, additional tidal creation in East Pasture and complete realignment of Tomasini Creek could cause a very slight increase in rearing habitat.
	Long-Term	**Beneficial** **Minor** Over long-term, levee degradation could increase extent of rearing habitat by hydrologically reconnecting existing channels to Lagunitas Creek and/or creating more tidal channels.	**Beneficial** **Moderate** Over long-term, levee degradation in West Pasture levees could increase rearing habitat by hydrologically reconnecting Fish Hatchery Creek and creating more tidal channels.	**Beneficial** **Moderate** Benefits would be expected to increase appreciably over the long-term due to natural development of new tidal channels and improvement in habitat and prey conditions within existing and created channels.	**Beneficial** **Major** Benefits would be expected to increase strikingly over the long-term due to natural development of new tidal channels and improvement in habitat and prey conditions within existing and created channels in Giacomini Ranch and Olema Marsh.	**Beneficial** **Major** Same as Alternative C

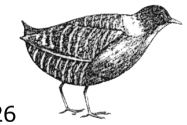


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Fish and Wildlife Resources	*Black and Clapper Rail* *Construction*	**Adverse** **Negligible** Construction of 11-acre mitigation component would occur in vicinity of existing rail habitat, but would occur outside breeding season and would not impact breeding or non-breeding individuals or young. Indirect effects would be barely detectable.	**Adverse** **Negligible** Construction would occur in vicinity of rail habitat, but would not impact breeding or non-breeding individuals or young. Construction at northern end of East Pasture would be conducted outside breeding season. Indirect effects would be barely detectable.	**Adverse** **Moderate** Impacts during construction would increase to appreciable, because construction would occur in and adjacent to existing habitat at northern end of West Pasture. Construction would be conducted outside breeding season. Indirect effects would be measurable.	**Adverse** **Moderate** Effects would be similar to Alternative. Limited construction during non-breeding season in Olema Marsh would be expected to only slightly increase impacts.	**Adverse** **Moderate** Same as Alternative C
	Short-Term	**Beneficial** **Negligible** The 11-acre mitigation component in the northern portion of the East Pasture would slightly increase breeding and refugia habitat for rails.	**Beneficial** **Negligible** During transitional period after construction, negligible to, at most, minor beneficial effects would be expected as pastures begin converting to brackish and tidal marsh, leading to temporary establishment of a weedy, ruderal habitat with fewer benefits for rails.	**Beneficial** **Negligible** Same as Alternative A	**Beneficial** **Negligible** Same as Alternative A	**Beneficial** **Negligible** Same as Alternative A
	Long-Term	**Beneficial** **Minor** Eventual levee degradation and subsequent expansion of tidal marsh would expand foraging habitat, but reduce diked refugia habitat relative to baseline conditions. However, net effect would be measurable beneficial.	**Beneficial** **Major** Restoration of East Pasture would result in appreciable benefit to rails by substantially increasing (>250 acres) appropriate breeding, foraging, and refugia habitat adjacent to existing rail habitat.	**Beneficial** **Major** Restoration of West and East Pastures would result in appreciable benefit to rails by substantially increasing (>350 acres) of appropriate breeding, foraging, and refugia habitat adjacent to existing rail habitat.	**Beneficial** **Major** Effects in Giacomini Ranch would be very similar to Alternative B. Eventual reestablishment of freshwater marsh vegetation in Olema Marsh after restoration would improve habitat quality for breeding black rails.	**Beneficial** **Major** Effects would be very similar to Alternative C. There would be a slight increase in habitat in the East Pasture relative to Alternative C due to excavation of some grassland areas to lower intertidal elevations.
	Other Special Status Species *Construction*	**Adverse / No Impact** **Negligible** Any temporary effects during construction of the 11-acre mitigation component would	**Beneficial / Adverse** **Negligible Moderate** Peregrine falcon may benefit slightly from flushing of prey. California freshwater shrimp	**Beneficial / Adverse** **Negligible Moderate** Effects would be very similar to Alternative A. Restoration of West, as well as East,	**Beneficial / Adverse** **Negligible Moderate** Effects would be very similar to Alternative B. Impacts to saltmarsh common	**Beneficial / Adverse** **Negligible Moderate** Same as Alternative C

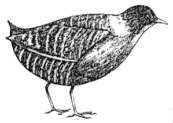


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
	Other Special Status Species *Construction (Cont.)*	be extremely small.	and northwestern pond turtle could be impacted by construction, including ditch filling, levee removal, and channel excavation. Common yellowthroat could be impacted by clearing of riparian habitat for eastern perimeter trail in documented breeding area.	Pastures, including expanded tidal influence and breaching of levees, would slightly increase impacts to northwestern pond turtle, California freshwater shrimp, and southwestern river otter. However, overall, intensity would remain the same as Alternative A.	yellowthroat would be reduced through elimination of the through-trail component for the eastern perimeter trail in favor of two spur trails that would not result in removal of riparian vegetation along the Point Reyes Mesa bluff.	
Fish and Wildlife Resources	*Short-Term/ Long-Term*	**Beneficial / Adverse** **Negligible Moderate** Discontinuation of agricultural management would slightly benefit California freshwater shrimp, saltmarsh common yellowthroat, green sturgeon, and southwestern river otter. Over long-term, levee degradation could have measurable adverse effect on northwestern pond turtles.	**Beneficial / Adverse** **Minor Moderate** Discontinuation of agricultural management and restoration of East Pasture would increase benefits for several species to being measurable, although increased salinity and loss of grassland could have negligible adverse effect on peregrine falcon feeding habitat and measurable adverse impacts on northwestern pond turtles.	**Beneficial / Adverse** **Minor Moderate** Effects would be very similar to Alternative A. Benefits for saltmarsh common yellowthroat, green sturgeon, and southwestern river otter would slightly increase with restoration of West Pasture. Would also slightly increase impacts to peregrine falcon and northwestern pond turtle. Intensity would still remain similar to Alternative A.	**Beneficial / Adverse** **Minor Moderate** Effects would be very similar to Alternative B. Restoration of Olema Marsh could slightly increase short-term and long-term impacts to California freshwater shrimp because of short-term water quality problems and long-term salinity changes. However, expansion of riparian habitat due to lowering of water levels would benefit yellowthroat.	**Beneficial / Adverse** **Minor Moderate** Effects would be very similar to Alternative C, with slight increases in benefits for saltmarsh common yellowthroat.
Cultural Resources						
	Cultural Landscapes	**No Impact** There would be no potential for impact to cultural landscape features in Project Area.	**Adverse** **Minor** Restoration of East Pasture would impact two cultural landscape features by filling manure lagoons (measurable) and creating eastern perimeter through-trail on historic railroad grade (negligible). Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.	**Adverse** **Minor** Effects on manure lagoons would be similar to Alternative A. The eastern perimeter trail would be constructed using a low- elevation boardwalk, which would have slightly less impact on historic railroad grade. Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.	**Adverse** **Minor** Effects on manure lagoons would be very similar to Alternative A. Through-trail component on historic railroad grade would be converted to two spur trails that would have slightly less impact in terms of construction/maintenance. Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.	**Adverse** **Minor** Effects on manure lagoons would be similar to Alternative A. One of the spur trails on historic railroad grade would be eliminated. The other spur trail would only require minimal enhancement. Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.

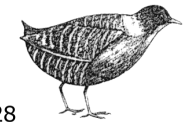


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Public Health and Safety						
Flooding	*Flooding Levee Road - East*	**No Impact** There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East Pasture levee	**Beneficial** **Minor** Hydraulic modeling suggests that vertical flood elevations could decrease measurably from existing conditions through breaching of East Pasture levee, with flood height potentially reduced as much as 0.3 to 0.5 feet during 5- to 10- year flood events.	**Beneficial** **Minor** Effects would be very similar to Alternative A in upstream most portion of Project Area, even with restoration of West Pasture through levee breaching.	**Beneficial** **Minor** Same as Alternatives A-B	**Beneficial** **Minor** Same as Alternatives A-B
	Flooding Levee Road - West	**No Impact** There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East and/or West Pasture levees.	**Beneficial** **Moderate** Hydraulic modeling suggests that vertical flood elevations could decrease appreciably from existing conditions through breaching of East Pasture levee, with flood height potentially reduced as much as 0.5 to 0.9 feet during 10- year flood events.	**Beneficial** **Moderate-Major** Hydraulic modeling suggests that vertical flood elevations could decrease appreciably Relative to existing conditions through West Pasture levee breaching and East Pasture levee removal, with flood height potentially reduced as much as 0.6 to 1.1 feet during 10- year flood events.	**Beneficial** **Moderate-Major** Same as Alternative B	**Beneficial** **Moderate-Major** Same as Alternative B
	Flooding Sir Francis Drake Blvd-Inverness Park/Inverness	**No Impact** There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East and/or West Pasture levees.	**No Impact** There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East and/or West Pasture levees.	**Adverse** **Minor** Hydraulic modeling suggests that effects of restoration would vary depending on flood event with breaching of West Pasture levee. During 2- to 10-year flood events, flood height in vicinity of private properties could drop by as much as 0.4 feet, however, it could increase as much as 1 foot during 50-year flood events. Increase in flood elevation would affect	**Adverse** **Moderate** Hydraulic modeling suggests that vertical flood elevations could increase relative to existing conditions during certain flood events with breaching of West Pasture levee. During 2- to 100-year flood events, flood height in vicinity of private properties could increase by as much as 1.6 feet. Increase in flood elevation would affect undeveloped portions of	**Adverse** **Moderate** Same as Alternative C

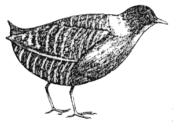


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Flooding	*Flooding* *Sir Francis Drake Blvd – Inverness Park/Inverness (Cont.)*			undeveloped portions of properties and would not negatively affect homes, driveways, or access routes to roads or pose threat to public health and safety.	properties (e.g., open space, pastures, and backyards) and would not negatively affect homes, driveways, or access routes to roads or pose a threat to public health and safety.	
Disease and Public Health	*Construction/ Short-Term*	**Beneficial** **Negligible**	**Adverse** **Minor** Construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A	**Adverse** **Minor** Same as Alternative A
	Long-Term	**Beneficial** **Minor** Discontinuation of intensive agricultural management such as irrigation, ditching, and pond maintenance would result in overall measurable reduction in extent and duration of conditions favorable to mosquito breeding, although some areas may become more favorable through increase in vegetation. There would no change in impounded conditions in Olema Marsh.	**Beneficial** **Moderate** In addition to discontinuation of agricultural management, restoration would remove ditches and ponds favorable for mosquito breeding and reduce extent of habitats characterized as having highest potential to support breeding by as much as 60 percent. Infrequently flooded tidal marshes may still support disease-carrying mosquito species, although most are not known carriers of West Nile Virus. There would be no change in Olema Marsh.	**Beneficial** **Moderate** Effects in Giacomini Ranch and Olema Marsh would be very similar to Alternative A, but, by restoring the West and East Pastures, would even further reduce habitats characterized as having the highest potential to support mosquito breeding by as much as 76 percent. Infrequently flooded tidal marshes may still support disease-carrying mosquito species, although most are not known carriers of West Nile Virus.	**Beneficial** **Moderate** Effects would be very similar to Alternative B. Extent of habitats with highest potential to support mosquito breeding would be reduced even further through expanded restoration of Giacomini Ranch and lowered water levels in Olema Marsh, with habitats decreased by as much as 80 percent. Infrequently flooded tidal marshes may still support disease-carrying mosquito species, although most are not known carriers of West Nile Virus.	**Beneficial** **Moderate** Same as Alternative C
Public Services						
Municipal Water Supply and Distribution	*Municipal Water Supply*	**Beneficial** **Major** Discontinuation of irrigation and conversion of water right	**Beneficial** **Moderate** As with No Action Alternative, water right conversion would	**Beneficial** **Moderate** Same as Alternative A	**Adverse** **Minor - Major** Based on hydraulic modeling, increasing tidal prism in	**Adverse** **Minor - Major** Same as Alternative C

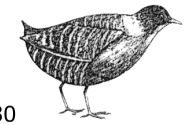


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Municipal Water Supply and Distribution	*Municipal Water Supply (Cont.)*	to beneficial instream uses would increase summer base streamflow by 20 percent and thereby decrease average chloride concentrations in upstream Lagunitas Creek during high tides by as much as 37 percent. This could decrease the magnitude of salinity intrusion events by increasing freshwater recharge of the aquifer.	increase summer streamflow, but this would be offset slightly by increase in tidal prism from East Pasture restoration. Hydraulic modeling points to a net 14 percent decrease in average salinities in upstream Lagunitas Creek during high tides, which could decrease the magnitude of salinity intrusion events by increasing freshwater recharge of the aquifer.		Olema Marsh could increase average salinities in upstream Lagunitas Creek during higher tides by 27 to 32 percent. There would be no change in frequency or duration of salinity intrusion events. Impact would be to municipal water supply operations in that it would increase need for, if not the frequency of, off-tide pumping and the time and freshwater recharge needed to reduce chlorides in the aquifer.	
	NEPA: Intensity Following Mitigation				**Minor** Major Olema Marsh restoration would not proceed until Park Service assured no substantial impact to municipal water supply operations. Smaller restoration elements could move forward if modeling shows potential for no more than minor adverse impact to operations. Monitoring would be conducted concurrently.	**Minor** Same as Alternative C
	CEQA: Significance Following Mitigation				**Less than Significant** Delaying implementation of major adaptive restoration elements for Olema Marsh would reduce impacts to less than significant.	**Less than Significant** Same as Alternative C
Wastewater Treatment and Disposal	*Short-Term*	**No Impact** No restoration would be conducted in the West Pasture where the only potential for impact exists.	**No Impact** Same as No Action Alternative	**Adverse** Negligible Levee breaching and tidegate removal could increase flooding, although relative to existing flooding conditions,	**Adverse** Negligible Same as Alternative B	**Adverse** Negligible Same as Alternative B

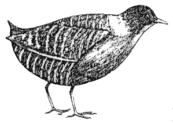


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Wastewater Treatment and Disposal	*Short-Term (Cont.)*			impact would be barely detectable. Less impoundment of flood flows could be beneficial.		
	Long-Term	**Adverse** Negligible/ Minor Potential degradation of levees could cause negligible impacts from increased flooding that could become minor impacts over the long-term due to sea level rise.	**Adverse** Negligible/ Minor Same as No Action Alternative	**Adverse** Negligible/ Minor Over long-term, sea-level rise could increase potential impacts to systems, thereby increasing effects to minor. Beneficial effects would still be expected from decrease in local groundwater table.	**Adverse** Negligible/ Minor Same as Alternative B	**Adverse** Negligible/ Minor Same as Alternative B
Traffic and Transportation	*Construction-Related Effects*	**Adverse** **Negligible** Barely detectable and very temporary increase in traffic from construction-related equipment and hauling of excavated sediments would occur on local roadways during construction of 11-acre mitigation component in East Pasture. No change in Level of Service.	**Adverse** **Negligible-Minor** Barely detectable, temporary increase in traffic would occur on most local roadways from construction-related equipment and hauling of excavated sediments during construction in East Pasture, except for Pierce Point Road, where impacts from hauling of sediment to quarries would be potentially be measurable.	**Adverse** **Minor** Effects would be very similar to Alternative A. Incorporation of West Pasture into project would increase construction-related equipment and hauling impacts to traffic on local roadways to measurable.	**Adverse** **Minor-Moderate** Effects would be very similar to Alternative B. Incorporation of Olema Marsh into project could result in temporary appreciable impacts to local roadways such as Levee Road and/or Bear Valley Road through temporary road closures during replacement of culverts.	**Adverse** **Minor-Moderate** Same as Alternative C
	Project-Related Effects	**Adverse** **Negligible** Changes in traffic from implementation would be related to changes in visitation. Barely detectable increases in traffic would occur because there would be no increase or enhancement of public access facilities relative to existing conditions.	**Adverse** **Negligible-Minor** Construction and expansion of public access facilities, in addition to more extensive restoration, would potentially increase visitation and result in negligible to minor adverse effects in traffic on local roadways, with minor effects expected in Point Reyes.	**Adverse** **Negligible-Minor** Same as Alternative A	**Adverse** **Negligible-Minor** Conversion of eastern perimeter through-trail to two spur trails and relocation of southern perimeter trail entrance would reduce impacts on traffic on local roadways in Point Reyes area, although impacts would still be minor.	**Adverse** **Negligible** Public access would be scaled back further relative to Alternative C, thereby increasing visitation only slightly relative to baseline conditions, which would result in barely detectable increases in traffic on local roadways.

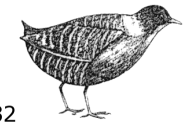


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Traffic and Transportation	*Parking*	**Adverse** **Negligible** Changes in parking demand would be related to changes in visitation. Barely detectable increases in parking demand would occur because there would be no increase or enhancement of public access facilities relative to existing conditions.	**Adverse** **Minor-Moderate** Improvement of public access facilities, in addition to more restoration, could increase visitation and result in minor to moderate adverse effects on parking demand, with moderate effects expected in Point Reyes Station because of lack of formal parking lots.	**Adverse** **Minor-Moderate** Same as Alternative A	**Adverse** **Minor** Conversion of eastern perimeter through-trail to two spur trails and relocation of southern perimeter trail entrance from C Street to Green Bridge would reduce parking demand in downtown Point Reyes, although there would still be minor impacts.	**Adverse** **Minor** Public access would be scaled back further relative to Alternative C, thereby increasing visitation only slightly relative to baseline conditions, which would result in barely detectable or, at most, minor increases in parking demand.
	Alternative Transportation	**No Impact** Alternative transportation would not be affected.	**Beneficial** **Moderate** Alternative transportation would be improved by connecting trails between Point Reyes Station and 1) Green Bridge County park (and possibly in future Inverness Park) and 2) Tomales Bay Trail.	**Beneficial** **Moderate** Same as Alternative A	**Beneficial** **Minor** Public transportation would be improved by connecting trail between Point Reyes Station and Green Bridge County park (and possibly in future Inverness Park), but there would be no through- trail to Tomales Bay Trail.	**Beneficial** **Negligible** Due to elimination of through-trails between communities, any benefits to alternative transportation from improvement of existing trails would be negligible.
Visitor and Resident Experience						
Public Access Resources	*Construction-Related Effects*	**Adverse** **Negligible** Increased noise levels during 11- acre mitigation component could slightly disrupt visitor experience in and around Project Area. Not expected to affect experience in other areas of park.	**Adverse** **Minor** Temporary closure of East Pasture trails and increased noise could temporarily disrupt visitor experience in and around Project Area, as well as for those traveling to other areas in park.	**Adverse** **Minor** Same as Alternative A	**Adverse** **Moderate** Effects would be similar to Alternative A, but with increased impact due to potential temporary road closures on Levee and Bear Valley Roads during Olema Marsh restoration.	**Adverse** **Moderate** Same as Alternative C
	Project-Related Effects	**No Impact** Public access facilities would not change relative to baseline conditions.	**Beneficial** **Major** Facilities and attractions/uses would increase more than 50 percent through construction of two through-trails (with one having bridge over Lagunitas Creek) and three viewing	**Beneficial** **Major** Effects would be very similar to Alternative A. Existing spur trail in West Pasture would be eliminated and converted to viewing area or overlook, with number of viewing areas	**Beneficial** **Moderate** Effects would be very similar to Alternative B, although eastern perimeter through-trail would be converted to two spur trails, resulting in less than 50 percent increase in	**Beneficial** **Minor** Public access would be scaled back, resulting in less than 25 percent increase in facilities and attractions/uses. There would be no through-trail or bridge components,

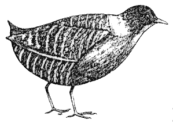


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Public Access Resources	*Project-Related Effects*		areas. Possibility of extending southern perimeter trail to Inverness Park through cooperative project with County in future.	totaling four. Possibility of extending southern perimeter trail to Inverness Park through cooperative project with County in future.	facilities and attractions/uses. Point Reyes Station entrance for southern perimeter trail would be relocated from C Street to Green Bridge.	only two spur trails – one extending Tomales Bay Trail and one where existing informal trail on East Pasture levee is currently located.
	Public Safety Conditions	**Adverse** Negligible No new facilities would be constructed, so there would be extremely negligible effects relative to existing conditions from negligible increase in visitation.	**Adverse** Minor While creation of a through-trail would decrease the potential for accidents relative to existing conditions, benefits would be offset to some degree by increased risk of pedestrian and bicycle conflicts with motor vehicles at trailheads and along roads because of increased traffic.	**Adverse** Minor Same as Alternative A	**Adverse** Minor Same as Alternative A. A slight increase in risk to public safety may arise from relocating trailhead for southern perimeter trail from 3rd and C Streets to the existing County park trail entrance at State Route 1 and the Green Bridge. Elimination of through-trail on eastern perimeter could reduce risk of accident along Mesa Road.	**Adverse** Negligible Potential risks to public safety would be reduced by elimination of the through-trail on the southern perimeter. Trailhead for southern perimeter spur trail would still be located at State Route 1 and Green Bridge, but users would decrease as a result of the decreased connectivity.
	Effects on Facilities of Other Agencies	**Adverse** Negligible The lack of through-trail connectivity would result in no more than a barely detectable effect on the number of users and condition of other parks' facilities.	**Adverse** Minor There would be a moderate increase in the amount of use relative to the low number currently using these parks, but use would not be expected to cause substantial deterioration of facilities.	**Adverse** Minor Same as Alternative A	**Adverse** Minor Same as Alternative A	**Adverse** Negligible Elimination of the through-trail would reduce number of users relative to the other action alternatives, but use would still increase negligibly because of ADA-compliant and other facilities.
Visual Resources and Viewsheds	*Construction*	**Adverse** **Negligible** Presence of heavy equipment for less than two months in remote corner of East Pasture would have barely detectable effect on views of Project Area.	**Adverse** **Minor** More extensive construction in East Pasture for one or more construction seasons would have measurable effect on views of Project Area, particularly from Point Reyes Station and White House Pool County park.	**Adverse** **Moderate** Construction would be even more extensive and of longer duration than in Alternative A, with inclusion of West Pasture in project expecting to require two or more construction seasons. This would have appreciable effect on views.	**Adverse** **Moderate** Construction would be even more extensive and of longer duration than in Alternative B, with inclusion of Olema Marsh in project expecting to require two or more construction seasons. This would have appreciable effect on views.	**Adverse** **Moderate** Construction would be even more extensive and of longer duration than in Alternative C, with inclusion of Mesa Road culvert in project requiring three or more construction seasons. This would have appreciable effect on views.

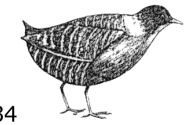


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Visual Resources and Viewsheds	*Short-Term*	**Adverse** **Minor** Discontinuation of intensive agricultural management with reduced or no grazing would either convert from highly managed Pastoral Landscape to a lightly managed one or to a Ruderal Landscape characterized by weedy grasslands.	**Adverse** **Minor** Discontinuation of agricultural management would convert highly managed Pastoral Landscape temporarily to Ruderal Landscapes of either weedy grassland or marsh with lower aesthetic value than baseline conditions, even with removal of infrastructure that would improve integrity and unity of visual resources.	**Adverse** **Minor** Effects would be very similar to Alternative A, although the extent of transitional marsh habitat relative to grassland habitat would increase with restoration of West Pasture.	**Adverse** **Moderate** Effects on Giacomini Ranch would be similar to Alternative B, but extensive temporary dieback in freshwater marsh vegetation in Olema Marsh with a decrease in water impoundment would increase short-term adverse effects to being appreciable.	**Adverse** **Moderate** Same as Alternative C
	Long-Term	**Beneficial** **Minor** Effects would be very similar to short-term, except that weediness would be expected to taper off over time, leading to a more natural appearance. In terms of cumulative impact, development along C Street would be expected to have only negligible effect due to presence of dairy barns under existing conditions.	**Beneficial** **Moderate** Over time, low-quality Pastoral Landscape would convert to Natural Landscape, although West Pasture and higher elevations of East Pasture would remain largely Ruderal Landscape with decreased aesthetic appeal relative to baseline conditions. Bridge may have negligible to minor adverse effect on views.	**Beneficial** **Moderate** Effects would be very similar to Alternative A, except that restoration of West Pasture would result in expansion of Natural Landscape relative to Ruderal Landscape. Bridge may have negligible to minor adverse effect on views.	**Beneficial** **Moderate** Effects would be very similar to Alternative B, except that more extensive restoration in East Pasture would increase extent of Natural Landscape relative to Ruderal Landscape. Over time, Natural Landscape would reestablish in Olema Marsh. Bridge may have negligible to minor adverse effect on views.	**Beneficial** **Moderate** Effects would be similar to Alternative C, except that negligible to minor impacts of public access on views would be reduced with elimination of bridge component.
Socioeconomics						
	Construction-Related Effects	**Adverse** **Negligible** Effects of construction on local economy would be slight as there would be no to negligible effects on visitation from traffic delays, facility closure, and construction-related noise.	**Adverse** **Negligible** Effects of construction on local economy would be slight as there would be no to negligible effects on visitation from traffic delays, facility closure, and construction-related noise.	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Effects of construction on local economy would be slight as there would still be no to negligible effects on visitation expected even with potential traffic delays or detours during Olema Marsh restoration.	**Adverse** **Negligible** Same as Alternative C

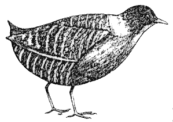
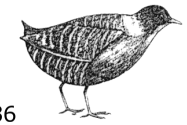


TABLE 3. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D: Preferred Alternative
Socioeconomics	*Project-Related Effects*	**Beneficial** **Negligible** Any increase in visitation rates associated with implementation of project would be slight, so benefits to local economy would be negligible.	**Beneficial** **Minor** While public access would undergo major improvement, local economy would still experience only minor benefits as most use would come from local or incidental users.	**Beneficial** **Minor** Same as Alternative A	**Beneficial** **Minor** While public access would undergo only moderate improvement, local economy would still experience minor benefits from local or incidental users.	**Beneficial** **Minor** Public access would undergo only minor improvement, which would slightly reduce benefits to local economy from visitation, although they would still remain minor.
Park Management and Operations						
	Construction-Related Effects	**Adverse** **Negligible** Construction would be paid by private monies. Base-funded support during construction would be expected to total less than 1 percent or $50,000 annually.	**Adverse** **Negligible** Construction would be paid by private and grant monies. Base-funded support during construction would be expected to total less than 1 percent or $50,000 annually.	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A
	Project-Related Effects	**Adverse** **Negligible** Base-funded support following implementation would be expected to total less than 1 percent or $50,000 annually.	**Adverse** **Negligible** Base-funded support following implementation would be expected to total less than 1 percent or $50,000 annually.	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A	**Adverse** **Negligible** Same as Alternative A

Definitions of Impact Intensity Used in Impact Analysis

No Impact	Causing no change
Negligible	Barely detectable change or change that is often within the range of natural variability
Minor	Causing small, but detectable or measurable change
Moderate	Causing apparent or appreciable change
Major or Substantial	Causing striking or highly noticeable change. Often considered a "significant" effect under CEQA



Chapter 3

Affected Environment

Introduction

The Project Area and the southern portion of the Tomales Bay watershed currently support many important biological, physical, and social resources that may be impacted either positively or negatively by alternatives proposed under the Giacomini Wetland Restoration Project. This chapter provides an understanding of both the general environmental setting of the Project Area and a more focused description of those specific resources that could be affected by implementation of the proposed project.

The Affected Environment description is required by NEPA (Section 1502.15) and CEQA regulations (Section 15125) to "succinctly describe" resources or impact areas that could be affected directly or indirectly by project implementation. According to CEQA regulations, this chapter must include a description of the physical environmental conditions in the vicinity of the proposed project, as they exist at the time that the Notice of Intent (NOI) and Notice of Preparation (NOP) are published or at the time environmental analysis is commenced (Section 15125). This environmental setting normally constitutes the baseline physical conditions by which the lead agencies, in this case the Park Service and SLC, determine whether an impact is significant (CEQA, Section 15125).

Knowledge of the regional setting is critical to the assessment of environmental impacts (CEQA, Section 15125). As described in Chapter 1, most of the impact areas or topics were selected through scoping based on the potential for negligible to significant or major impacts either on a temporary, short-term, or long-term basis. While NEPA is only triggered when there is a physical impact on the environment, the Council of Environmental Quality (CEQ) regulations require analysis of social and economic effects in NEPA documents where they might be affected (NPS, Director's Order 12). CEQA does not require analysis of economic or social effects, with the emphasis primarily on physical changes, however, economic or social effects of a project may be used to determine the significance of physical changes caused by the project (CEQA, Section 15131).

Scoping determined that the areas of the environment that could be affected by the proposed project are:

- Land Use,
- Geologic Resources,
- Soil Resources,
- Air Resources,
- Water Resources,
- Vegetation Resources,
- Fish and Wildlife Resources,
- Cultural Resources,
- Public Health and Safety,
- Public Services,
- Visitor and Resident Experience,
- Socioeconomic Resources, and
- Park Management and Operations.

Those impact areas or topics on which the proposed project would have no or only a very negligible effect are described in Chapter 1, but are dismissed from further analysis in this chapter and Chapter 4.

The Affected Environment chapter contains a detailed description or background information on the resource or impact topics. This information provided was gathered from numerous sources, including literature reviews, existing data, and baseline studies conducted as part of the project planning effort within the Project Area. Where applicable, resource or impact topics include a brief discussion of pertinent regulations, laws, ordinances, and policies to create a framework or context in which existing conditions and impacts can be objectively evaluated. Additional information on regulations pertaining to this project appears in Chapters 1 and 6.

Project Setting

Regional and Park Context

The Project Area is located in central California, in western Marin County, approximately 40 miles northwest of the city of San Francisco (Figure 1). It is comprised of federal lands managed by the Seashore, a unit of the national park system, and is within 50 miles of the nine-county San Francisco Bay Area, the fifth largest metropolitan area in the United States. Generally, the more developed regions of the bay area surround the bay itself, with smaller cities, towns, open space and agricultural areas in an outer ring around the urban core. Thirty-three percent (110,822 acres) of the 332,800 acres in Marin County is held as parks, open space and watershed (Marin County Community Development Agency 2004). Fifty-one percent (169,000 acres) is zoned for agricultural use. Developed lands constitute only 11 percent of the county, while 5 percent of the county currently has future development potential (Marin County Community Development Agency 2005).

Roughly 90 percent of the 250,000 residents of Marin County live in the eastern half of the county along State Highway 101.

While eastern Marin is heavily developed along the Highway 101 corridor, western Marin is primarily rural with scattered, small unincorporated towns that serve ranchers and farmers, local residents, and tourists. Roughly 90 percent of the 250,000 residents of Marin County live in the eastern half of the County along the major transportation corridor -- State Highway 101. The Seashore lies on the western perimeter of Marin County, encompassing 71,046 acres beaches, coastal cliffs and headlands, marine terraces, coastal uplands, woodlands, and forests on the Point Reyes Peninsula. The north district of GGNRA adds another approximately 20,000 acres of federally protected lands. Together, these lands account 86 miles of shoreline on both the Pacific Ocean and Tomales Bay.

The Seashore is bounded to the north, west and southwest by the Pacific Ocean and to the east by the residential communities of Inverness, Inverness Park, Point Reyes Station, Olema, and Dogtown. The town of Bolinas is south of the Seashore at the southern tip of the Peninsula. To the east, the Seashore is bounded by Tomales Bay, most of which falls under Park Service ownership and/or oversight. An estimated 11.000 people live in 11 towns and villages in the Tomales Bay watershed (TBWC 2003). The census population figure does not count the many part-time residents who maintain second homes in west Marin.

East of the Seashore and GGNRA, land use is a mix of private residential and agricultural lands, publicly held watershed, and parks and open space. Adjacent to the park are areas managed by Audubon Canyon Ranch, Marin Municipal Water District, Tomales Bay and Samuel P. Taylor State Parks, and Marin County Open Space District lands. Marine boundaries are shared with the Gulf of the Farallones National Marine Sanctuary and Tomales Bay State Park. Some agricultural parcels have conservation easements deeded to the Marin Agricultural Land Trust, in which the owners have released development rights to protect rural agriculture from development pressures.

Park and Project Area History

The original inhabitants of the Point Reyes area were the Coast Miwok Indians. The Coast Miwok subsisted as hunters and gatherers, relying on the area's plentiful natural resources such as game, birds, fish, shellfish, nuts, fruits, and vegetables for subsistence ((Livingston 1999; Marin County Community Development Agency 2001). Most experts believe that Point Reyes is the site of the first recorded English-Native American contact in North America. Sir Francis Drake may have landed here in 1579 to careen his ship before sailing across the Pacific on a circumnavigation of the globe. He and his crew are believed to have spent five weeks on the coast, repairing his damaged ship and making contact with the Coast Miwok (Kroeber 1953). Sixteen years later in 1595, the first recorded shipwreck on the West Coast occurred when the Spanish galleon San Augustin was wrecked in what is now Drakes Bay. Since then, Point Reyes became a draw from many other sailors/explorers, some of whom lost their ships off the coast. It was Spanish sailor/explorer Sebastian Vizcaino who named this area Point Reyes (Punta de los Reyes) in 1602. In 1793, a Spanish lieutenant

traveled through the Olema Valley and, after noting "a wonderment of various settlements along the [Tomales] Bay shore," recommended the Olema-Point Reyes Station area as a fine location for a mission or establishment (Livingston 1999 *in* Marin County Community Development Agency 2001). While a mission was never established at Point Reyes Station, land grants in the Point Reyes Peninsula and surrounding lands were established during the Mexican period. Point Reyes Station was located within the southwestern corner of the vast Rancho Nicasio land grant, which was granted by the Mexican governor in 1845 to Pablo de la Guerra and Juan Cooper (Livingston 1999 *in* Marin County Community Development Agency 2001). Settlement by Mexicans and, later, Americans displaced the Coast Miwok from their homes and led to drastic reductions in the number of these people through violence and disease (Cook 1976).

Most of the Mexican land grants followed a tumultuous series of ownership changes following the Mexican-American war. The Point Reyes Station portion of the Rancho Nicasio land grant eventually passed to James Black in 1851, who owned these lands for more than a century (Livingston 1999 *in* Marin County Community Development Agency 2001). In 1873, Marin County sheriff James Stocker rented the "rolling hills and level mesa of land" at Point Reyes Station from the Black-Burdell family for establishment of a dairy ranch (Livingston 1999 *in* Marin County Community Development Agency 2001). Vedanta near Bear Valley became the center of various dairies during the late 1800s, with Bear Valley Creek running through the dairy yard. Bear Valley Creek and Olema Marsh areas were a part of historic W Ranch. Fields around Bear Valley and Olema were cleared of brush in the 1860's and heavily grazed. Some fields in Olema and Bear Valleys were used for silage.

In the late 1800s, the Point Reyes region became known throughout California as a premiere dairy and beef cattle ranching region, with its cream and butter products commanding top dollar in San Francisco. As one writer noted, "the product of Point Reyes can be summed up in one word – butter" (Munro-Fraser 1880; Garcia and Associates 2004). Most of the ranches in the Point Reyes area specialized in dairying, cheese and butter production, although some moved into beef cattle ranching and artichoke farming. While people from many countries immigrated to California, the Italian-Swiss and Portuguese immigrants were particular numerous and eventually moved into dairying on the California coastline (Raup 1951). Roads were needed to connect the ranches with outside markets. The original road from Olema, which was the main town at that time, to the Point Reyes Peninsula was later replaced in 1875 with a road that follows the current Bear Valley Road - Sir Francis Drake Boulevard path (Livingston 1994). During the late 1800s-early 1900s, the lower portion of the Bear Valley Creek watershed was leveed by construction of a road berm across the mouth of Bear Valley Creek for Levee Road near its confluence with Lagunitas Creek.

The other industry that boomed in the area during the late 1800s was logging of the Inverness and Bolinas Ridges adjoining Tomales Bay. Until the 1880s, 100-ton steamships navigated Lagunitas Creek -- formerly known as Papermill Creek – on high tides to the old paper mill located near the existing Green Bridge (PWA et al. 1993). In 1874, the North Pacific Coast Railroad constructed tracks through Point Reyes Station, connecting Sausalito to the Russian River area north of Marin County, where timber and butter could be transported to market (Livingston 1999 *in* Marin County Community Development Agency 2001). While logging activities in the Point Reyes area increased exponentially during the late 1800s, removal of trees for lumber was limited in the Bear Valley Creek watershed and restricted largely to that needed by the ranch itself.

Construction of the railroad and growth of the local dairy industry proved the impetus for the birth of the town of Point Reyes Station around 1875 (Livingston 1999 *in* Marin County Community Development Agency 2001). Hotels, saloons, schools, churches, and stores were quickly built to accommodate train passengers and visitors to the town. Even the devastating 1906 San Francisco Earthquake – the epicenter of which was once believed to be Olema, but is now thought by the USGS to be offshore of the Golden Gate Bridge -- did not derail this period of prosperity, with merchants rebuilding stores destroyed in the earthquake with even more grandiose structures (Livingston 1999 *in* Marin County Community Development Agency 2001). The existing Giacomini Dairy Facility property on the Point Reyes Mesa underwent several ownership changes during the late 1800s and early 1900s, including ownership stints by the Burdell and Wilson families (Garcia and Associates 2004). In 1917, the Filippini family established a small 50-cow dairy at the location of the existing Giacomini Ranch Dairy Facility (Livingston 1999 *in* Marin County Community Development Agency 2001).

However, as quickly as the town's fortunes waxed following construction of the railroad and growth of the dairy industry, its fortunes waned following closure of the railroad in 1933 and the onset of the Great Depression (Livingston 1999 *in* Marin County Community Development Agency 2001). At the end of World

War II, the Giacomini family assumed ownership of the Filippini Dairy and leveed approximately 550 acres of marshland for use as pastures (Livingston 1999 *in* Marin County Community Development Agency 2001). Many of the community's original businesses folded in the 1950s, only to be replaced with a slightly different type of commercial enterprise when the Seashore was established in 1962 (Livingston 1999 *in* Marin County Community Development Agency 2001). These new businesses catered to more of a tourist economy and included small shops such as a book store, natural foods store, restaurants, and bakeries.

Point Reyes had been the object of land protection efforts since the first park feasibility study was authorized in the 1930s. As pressure to develop lands along the Marin coast increased, so did the momentum to protect it.

Point Reyes had been the object of land protection efforts since the first park feasibility study was authorized in the 1930s. As pressure to develop lands along the Marin coast increased, so did the momentum to protect it. Within the Drakes Estero watershed, large tracts of agricultural lands had been sold to developers and were already being subdivided and developed with approximately 12 houses constructed at Limantour Beach. It was this development pressure that encouraged Congress to push forward with legislation in the early 1960s to protect the coastal resources unique to the Point Reyes peninsula. Although ownership of ranches on the Point Reyes Peninsula transferred to the Park Service, many of the ranch families remained on the land through long-term leases. The Seashore's enabling legislation not only protects coastal and natural resources, but allows for preservation of the pastoral landscape created by more than 100 years of dairying and beef cattle ranching. Almost 10 years later, the GGNRA was established directly adjacent to the Seashore. The eastern portion of the Tomales Bay shoreline and portions of the Olema Valley, including many agricultural operations such as the Giacomini Ranch, were eventually incorporated into the GGNRA when its boundaries were expanded in the 1980s. Since then, a few of these ranchers, including the Martinelli and Giacomini families, have sold their ranches to the Park Service for inclusion in the GGNRA.

Regional and Project Area Climate

The central and southern regions of California are classified as having a Mediterranean climate, generally characterized by wet winters and dry summers. Within these regions of California, however, there is considerable variation in temperature and precipitation, from the extremely hot, dry summers in Death Valley (lowest point in the continental United States) to the foggy, cool summers on California's central coast. The climate along California's central coast is strongly influenced by its marine environment, which tends to moderate temperature extremes through a semi-permanent high-pressure system that is centered over the northeastern Pacific Ocean. Temperatures do not vary much over the year in this region, ranging from the high 50s in the winter to the low 60s in the summer (BAAQMD 2003).

During the winter and spring, the Pacific high-pressure system weakens and moves south, allowing storm systems to move through the region, usually providing copious amounts of precipitation in series of discrete storms. The west Marin coastline receives an average of 38.2 inches of rain annually. This amount is higher than much of the San Francisco Bay area due to the somewhat more elevated terrain along the coast. Most annual rainfall in Marin County occurs from November through March. In the winter, proximity to the ocean keeps the coastal regions relatively warm (BAAQMD 2003). In the summer, the relatively northern location of the strong high-pressure system results in clear skies and hot temperatures further inland and fog and cooler temperatures along the coast. Very little precipitation occurs during the summer months, because storm systems are blocked by the high-pressure system. In the summer months, the marine air is cooled as it passes over the offshore upwelling region and forms a fog layer along the coast (BAAQMD 2003). Beginning in the fall, high pressure forming over the warmer inland areas breaks the summer pattern, introducing warm, dry winds from the northeast and east. The warmest months are September and October, with daily high temperatures averaging approximately 65 to 69 degrees Fahrenheit (BAAQMD 2003).

In the vicinity of the Project Area, average temperatures (°F) during the summer vary from the high 40s to the low-to-middle 70s. During the winter, average temperatures (°F) vary from the mid-to-upper 30s to the upper 50s-low 60s. Approximately 84 percent of the precipitation occurs during November through March, generally in association with storm systems that move through the region. Winter precipitation averages 39.57 inches, slightly higher than the 38.2 inches recorded for west Marin County region. Within the Tomales Bay watershed, approximately 60 percent of the rainfall is lost to evapotranspiration; 6 percent is removed for use outside the watershed, and the remainder flows into Tomales Bay (Smith and Hollibaugh 1998). Summer precipitation is low, averaging less than 0.2 inches per month because of the Pacific high-pressure system.

In addition to intrannual variability in precipitation, coastal California is subject to extremely wet or extremely dry periods of one or more years driven by long-term climatic trends that affect annual precipitation. El Nino climatic cycles usually produce extremely wet winters, while La Nina ones produce extremely dry winters and can result in drought conditions.

Land Use and Planning

General Land Use and Planning

While conservationists halted large-scale development plans in West Marin in the 1960s, helping to create the National Seashore in the process, the region continues to struggle with land use issues into the new century. Since the 1800s, west Marin has supported dairy and beef cattle ranches and was once identified as one of the leading dairy regions in California. Changing market dynamics have threatened the ranching way of life in this rural enclave of the San Francisco Bay region. A number of family farms have closed in recent decades to the economic pressures of competing with the large-scale agricultural operations in California's Central Valley. In addition, the strong housing market in Marin and elsewhere in the San Francisco Bay area continues to place pressure on undeveloped areas within the county. As with many other rural areas in California, local communities continue to grapple with the issue of improving local economic viability with maintaining rural character and small town environments.

While conservationists halted large-scale development plans in West Marin in the 1960s, helping to create the National Seashore in the process, the region continues to struggle with land use issues into the new century

Tomales Bay and the Point Reyes region falls within a complex, multi-jurisdictional region, with lands held by a variety of private and public entities, including County, local water districts, state agencies (State Land Commission, state parks, Wildlife Conservation Board, CalTrans), and federal agencies such as the Park Service and the U.S. Coast Guard. Thirty-three percent (110.822 acres) of the 332,800 acres in Marin County is held as parks, open space, and watershed (Marin County Community Development Agency 2005). Fifty-one percent (169,000 acres) is zoned for agricultural use (Marin County Community Development Agency 2005). Developed lands constitute only 11 percent of the county, while 5 percent of the county has future development potential (Marin County Community Development Agency 2005). The complexity is increased by the existence of land use plans and objectives established by non-landowners such as local towns or communities and regulatory agencies such as the California Coastal Commission that oversees implementation of the California Coastal Act through the Local Coastal Program or LCPs.

Several agencies and organizations have established land use plans or guidance for development within the unincorporated portion of Marin County. These land use plans or guidance documents include the Point Reyes Station Community Plan, the Marin County Local Coastal Program Unit II, the Marin Countywide Plan, and the Marin County Zoning Ordinance. On federal park lands, actions are guided by the park's General Management Plan (GMP). The Seashore is currently in the process of revising the GMP for the Seashore and the north

district of the GGNRA, which it manages. There are no tribal land use plans within the Project Area or immediate vicinity.

The California Government Code requires each local planning agency, such as the County of Marin, to adopt a comprehensive, long-term general plan for the physical development of the area over which it has jurisdiction. Local planning agencies may elect to prepare community plans, based on public participation and specific local conditions and goals, for individual communities within the general plan boundaries. Future planning decisions can then be based both on the general and the community-specific plan. In the Coastal Zone of California, LCPs supersede all local land use planning and take precedence over all other local policies and zoning. The Project Area falls within the Marin County LCP Unit II.

On federal lands, projects are guided both by the LCP (Marin County Comprehensive Planning Department 1981) – as federal agencies must be consistent with the policies of the Coastal Act – and the GMP. In general, there should agreement between these two plans, although the GMP is, by definition, more limited to scope to just federal parklands and is more general in nature than the LCP (Marin County Comprehensive Planning Department 1981).

Park Management and Zoning

Through a memorandum of agreement between the two national parks, the Seashore manages the 19,265 acres of Bolinas Ridge and portions of Olema Valley and Tomales Bay for GGNRA, including the Giacomini Ranch. The boundaries of the two parks extend on both sides of Tomales Bay, with the Seashore's boundary extending from the Point Reyes Peninsula into subtidal lands on the west side of Tomales Bay and GGNRA's boundary covering the eastern side of Tomales Bay. These incorporated lands include both lands owned by the Park Service, as well as lands that are in private, county, or state ownership. In addition, the Seashore has a 50-year lease on most of Tomales Bay's subtidal lands from SLC to create a more seamless management boundary of the Bay's aquatic resources.

The Seashore and GGNRA currently share a General Management Plan (NPS 1980), which uses three zoning designations to guide park management -- Natural Resource Zone, Historic Resource Zone, and Special Use Zone. The Natural Resource Zone covers pastoral lands, natural landscape areas, sensitive resources, designated wilderness and marine reserves. Historic ranches, the Point Reyes lighthouse, and the lifesaving station are included in the Historic Resource Zone: more information on the Historic Resource Zone can be found under the Cultural Resources section. A third zone called Special Use Zone exists within the boundaries of the Seashore and GGNRA, but these lands are managed by another entity such as Mt. Tamalpais State Park and Audubon Canyon Ranch.

The Natural Resource Zone contains two management zones that are pertinent to the Giacomini project – the Pastoral Landscape Management Zone and Special Protection Zone. Approximately 19,000 acres of the northern Point Reyes Peninsula of the Seashore have been retained in agricultural production within the pastoral zone that supports beef and dairy production. The north district GGNRA in northern Olema Valley contains an additional 10,500 acres leased for cattle grazing. These lands constitute the Pastoral Landscape Management Zone. Pastoral operations presently include six dairies and nine beef cattle ranches. The current GMP indicates that, at a minimum, agricultural buildings and open grasslands will be retained in these areas, and, where feasible, livestock grazing will continue within the limits of carefully monitored range capacities (NPS 1980). This plan acknowledged, however, that future resource management studies could significantly alter the configuration of this zone.

The Special Protection Zone incorporates lands that have received legislative or special administrative recognition of exceptional natural qualities requiring strict protection measures. It includes the Philip Burton Wilderness Area, Gulf of the Farallones National Marine Sanctuary, State of California Marine Reserves, shorelines, and riparian corridors. The boundary for the Gulf of the Farallones National Marine Sanctuary extends into the southern portion of Tomales Bay and is defined as mean high tide.

Marin Countywide Plan

California State law requires that all cities and counties prepare and adopt general plans. These plans must be comprehensive, long-range and internally consistent. Every plan must address seven specific topics, or

"elements". The County of Marin is currently in the process of updating the Marin Countywide Plan (CWP; Marin County Community Development Agency 2005). The draft EIR was initially released in August 2005 and has been subsequently revised. The purpose of the Plan Update is to set policy guidelines for future conservation and development in the county and to address changed conditions since the last revision of the CWP (Marin County Community Development Agency 1994).

Planning Policies: Point Reyes, including the Project Area, is located in an unincorporated area of the county. The CWP establishes an overall framework and set of goals for countywide development in unincorporated areas. The draft 2005 CWP update also includes implementing program concepts for updating the 2003 Development Code. Included in updated CWP are the seven mandatory General Plan Elements required by the State Planning and Zoning Laws (e.g., Conservation, Land Use, Circulation, Noise, and Safety), as well as five optional elements that were included in the 1994 CWP (Agriculture, Community Facilities, Parks and Recreation, Trails, and Economic). Many unincorporated communities areas of Marin are guided by community plans that provide specific direction regarding land use, transportation, community facilities, building design, and environmental quality, as well as issues unique to a particular community (CWP 2005). The town of Point Reyes Station has developed the Point Reyes Station Community Plan, which was last revised in 2001 (see description below).

The draft CWP (2005) includes goals, policies, and specific implementation objectives for topics included under each of the required and optional elements. Some of the most pertinent policies or implementation objectives are summarized briefly below.

- Lands of *GGNRA* should be retained in natural state to the greatest extent possible.
- *Protect Open Lands in the Coastal Recreational Corridor* to preserve the rural character, agriculture, and open lands, and protect existing communities and recreational opportunities in the Coastal Corridor.
- *Maintain Village Character in West Marin* through establishment of Community Plans.
- *Restore and Enhance Watersheds*.
- *Promote Natural Stream Channel Function*, including protection and enhancement of fish habitat.
- *Protect Wetlands, Essential Habitat for Special-Status Species, Sensitive Natural Communities, and Important Habitat Wildlife Nursery Areas and Movement Corridors*.
- *Preserve Ecotones* to ensure that "ecotones," or natural transitions between habitat types, are preserved and enhanced because of their importance to wildlife.
- *Limit Access to Wetlands* to avoid or minimize disturbance to wetlands, necessary buffer areas, and associated important wildlife habitat while facilitating public use, enjoyment, and appreciation of bayfront lands.
- *Protect people and property* from risks associated with flooding and inundation.
- *Keep West Marin Rural* by limiting West Marin roads to two lanes, and work with State and federal agencies and local communities to enhance road safety, improve pedestrian, bicycle and transit access through means such as creating an East/West Greenway along the railroad right-of-way.
- *Promote Transportation Alternatives* by working with local, state, and federal governments, businesses, schools, seniors, and environmental groups to encourage use of transit, vanpools, carpools, car sharing, bicycles, and walking for commuting.

Land Use: The Draft 2005 CWP Update retains the "corridor" concept of the 1994 CWP, dividing the County into designated regional units based on specific geographic and environmental characteristics and natural boundaries formed by north/south trending geomorphic ridges. The Project Area falls within the Coastal Corridor. The Coastal Corridor, adjacent to the Pacific Ocean, is designated for federal parklands, recreational uses, agriculture, and the preservation of existing small coastal communities. In addition to the four environmental corridors, there are seven planning areas that define Marin County. One of the planning areas covers both the Coastal and Inland Rural Corridors of West Marin. The West Marin planning area generally consists of open space and agricultural lands and small villages located west of the City Centered Corridor

from Fort Cronkite Baker in the south to the Sonoma County line in the north and includes GGNRA, the Seashore, Point Reyes Station, and the Project Area.

Within the West Marin planning area, the Giacomini Ranch is currently designated C-AG1, which is Coastal Agricultural with one unit allowed per 31-60 acres (Figure 18). Olema Marsh is designated C-OS for Coastal Open Space (Figure 18). In general, the Giacomini Ranch is agricultural land that is almost entirely bounded by residential, commercial, and open space lands. The nearest agricultural operations would be the Martinelli Ranch north of the East Pasture, which is operated under lease by GGNRA, and the Genazzi Ranch, which is southwest of the Green Bridge and south of State Route 1. Surrounding lands to the east of the Giacomini Ranch are a mixture of land use designations summarized as follows (Figure 18):

- *C-OS* (Coastal Open Space): Martinelli Ranch parcel of GGNRA; Green Bridge County Park; White House Pool County Park.
- *C-AG3* (Coastal Agricultural with one unit allowed per 1-9 acres): Residential neighborhoods on Point Reyes Mesa; House on west side of Olema Marsh and east of Bear Valley Road.
- *C-MF3* (Coastal Multi-Family with five to 10 units allowed per acre): Residential neighborhood directly north of Giacomini Dairy;
- *C-SF5* (Coastal Single Family with 2-4 units allowed per acre): Residential and commercial neighborhood near and along 3rd and C Streets in Point Reyes Station;
- *C-RS* (Coastal Residential Commercial): Residential and commercial neighborhood near intersection of State Route 1 and Levee Road at Green Bridge;
- *C-SF4* (Coastal Single Family with one to two units allowed per acre): Residential neighborhood on north side of Levee Road.
- *C-SF3* (Coastal Single Family with one unit allowed per 1-5 acres): Residential neighborhood on west side of Sir Francis Drake Boulevard north of Bear Valley Road throughout Inverness Park; the Lucchesi and Kostelic residences; and a portion of the undeveloped West Pasture between the Gradjanski and Lucchesi/Kostelic residences.
- *C-GC* (Coastal General Commercial with Floor to Area Ratio of 0.05 to 0.30): Perry's Deli and adjacent stores and Gradjanski residence in Inverness Park.

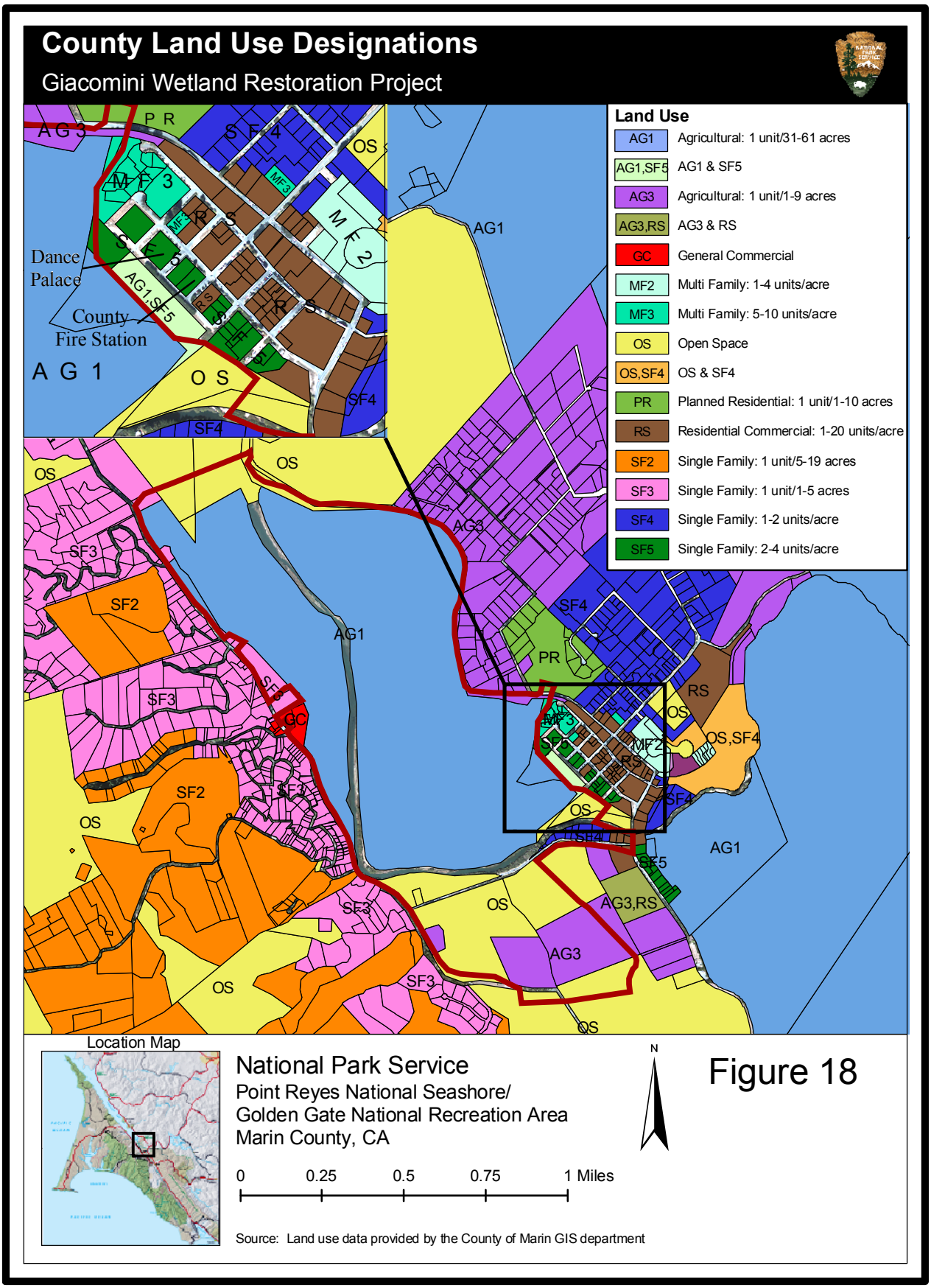
Marin County Zoning Ordinance

The County regulates activities by state and local agencies through ordinances, codes, and other measures. The zoning code (Marin County Code Title 22) establishes development regulations that are based on land use designations for different areas established in the CWP. Within each zoning district, specific regulations are established for permitted and conditional land uses and for maximum density and building height.

The Giacomini Ranch lowlands in the East and West Pastures are zoned Coastal Agricultural Production Zone, with 1 housing unit per 60 acres (Figure 19). The portion of Olema Marsh owned by Audubon Canyon Ranch is zoned Open Area, while the portion owned by the Seashore is zoned Agricultural, Residential, Planned (Figure 19). The portion of the dairy facility fronting C Street is zoned Coastal Residential, Agricultural, 10,000-square-foot minimum lot size (Figure 19). The upland area near Mesa Road and the Giacomini Hunt Lodge is zoned Coastal Residential, Agricultural, with 1 housing unit per acre (Figure 19).

Zoning of surrounding lands is a mixture of zoning districts, similar to the land use designations. These are summarized as follows (Figure 19):

- *C-O-A* (Coastal Open Area): Martinelli Ranch parcel of GGNRA; Green Bridge County Park; White House Pool County Park.
- *C-ARP-1* (Coastal Agricultural, Residential, Planned, 1 unit per acre): Residential neighborhood on Point Reyes Mesa;
- *C-RMP-6.5* (Coastal Residential Multiple Planned, 6.5 units per acre): Residential neighborhood directly north of Giacomini Dairy;


County Land Use Designations
Giacomini Wetland Restoration Project
Land Use
AG1 Agricultural: 1 unit/31-61 acres
AG1,SF5 AG1 & SF5
AG3 Agricultural: 1 unit/1-9 acres
AG3,RS AG3 & RS
GC General Commercial
MF2 Multi Family: 1-4 units/acre
MF3 Multi Family: 5-10 units/acre
OS Open Space
OS,SF4 OS & SF4
PR Planned Residential: 1 unit/1-10 acres
RS Residential Commercial: 1-20 units/acre
SF2 Single Family: 1 unit/5-19 acres
SF3 Single Family: 1 unit/1-5 acres
SF4 Single Family: 1-2 units/acre
SF5 Single Family: 2-4 units/acre
Dance Palace
County Fire Station
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0 0.25 0.5 0.75 1 Miles
Source: Land use data provided by the County of Marin GIS department
Figure 18

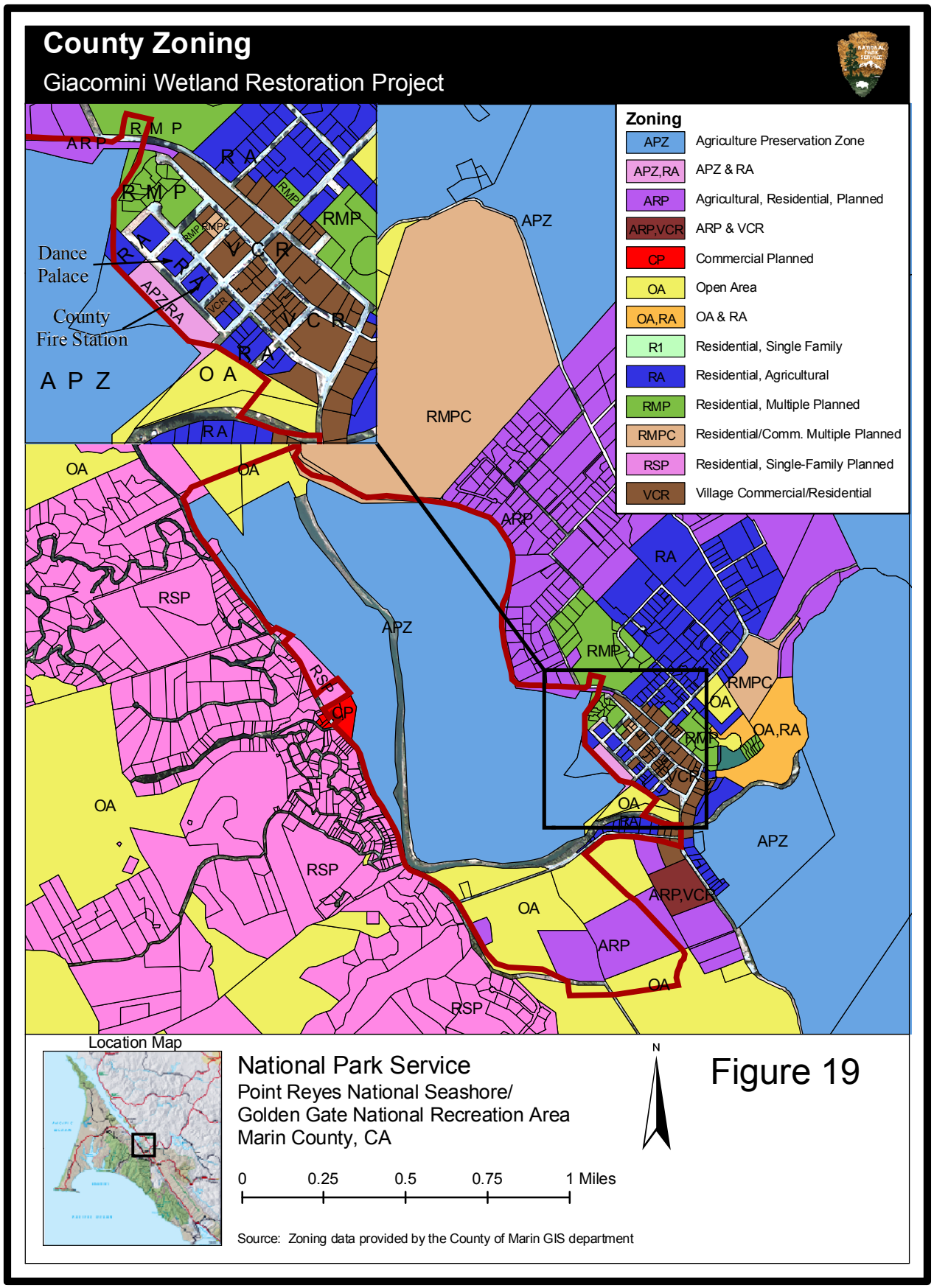

County Zoning
Giacomini Wetland Restoration Project
Zoning
APZ Agriculture Preservation Zone
APZ,RA APZ & RA
ARP Agricultural, Residential, Planned
ARP,VCR ARP & VCR
CP Commercial Planned
OA Open Area
OA,RA OA & RA
R1 Residential, Single Family
RA Residential, Agricultural
RMP Residential, Multiple Planned
RMPC Residential/Comm. Multiple Planned
RSP Residential, Single-Family Planned
VCR Village Commercial/Residential
Dance Palace
County Fire Station
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0 0.25 0.5 0.75 1 Miles
Source: Zoning data provided by the County of Marin GIS department

Figure 19

- *C-R-A:B-2* (Coastal Residential, Agricultural 10,000 square foot minimum lot size): Residential and commercial neighborhood near and along 3rd and C Streets in Point Reyes Station;
- *C-VCR:B-2* (Coastal Village Commercial Residential 10,000 square foot minimum lot size): Residential and commercial neighborhood near intersection of State Route 1 and Levee Road at Green Bridge;
- *C-R-A:B-3* (Coastal Residential, Agricultural 20,000 square foot minimum lot size): Residential neighborhood on north side of Levee Road.
- *C-ARP-5* (Coastal Agricultural, Residential, Planned, 1 unit per 5 acres): House on west side of Olema Marsh and east of Bear Valley Road.
- *C-RSP* (Coastal Residential Single Family Planned): West side of Sir Francis Drake Boulevard north of Bear Valley Road throughout Inverness Park and a portion of the West Pasture between the Gradjanski and Lucchesi/Kostelic residences, including the Lucchesi and Kostelic residences.
- *C-GC* (Coastal Commercial Planned): Perry's Deli and adjacent stores and Gradjanski residence in Inverness Park.

Marin County Local Coast Program Unit II

In 1976, the California Legislature enacted the Coastal Act, which created a mandate for coastal counties to manage the conservation and development of coastal resources through a comprehensive planning and regulatory program called the LCP. The LCP is a planning document that identifies the location, type, densities, and other ground rules for future development in the coastal zone. Each LCP includes a land use plan and its implementing measures. These programs govern decisions that determine the short and long term conservation and use of coastal resources. LCPs are designed to be updated regularly: The Marin County Community Development Agency was planning to update the LCP (Marin County Comprehensive Planning Department 1981) as part of the updated CWP process, but has postponed the LCP update.

Marin County's Local Coastal Program is divided into two units: Unit I and Unit II. Unit II was certified in 1981 and includes the communities of Olema, Point Reyes Station, Inverness, Dillon Beach and Oceana Marin, Marshall, and Tomales. The primary goals of the LCP are to ensure that the local government's land use plans, zoning ordinances, zoning district maps, and implemented actions meet the requirements of -- and implement the provisions and polices of -- the Coastal Act at the local level.

Generally, the Coastal Act requires protection, enhancement, and restoration of environmentally sensitive habitats (including wetlands and riparian habitat); protection and expansion of public access to the shoreline and recreational opportunities and resources; protection of the scenic coastal landscape; and protection of productive agricultural lands. The LCP (Marin County Comprehensive Planning Department 1981) has grouped its policies under four major headings: Public Access and Recreation, Resource Protection (including Natural and Agricultural), Tomales Bay Uses, and Public Services and New Development.

As noted earlier, where there are overlapping policies, the LCP policies supersede those of the County and other organizations in the Coastal Zone. Because the LCP (Marin County Comprehensive Planning Department 1981) is the primary planning document guiding development in the region where the Project Area is located, specific policies that potentially pertain to the proposed project are outlined below:

Resource Protection-Natural Resources

- *Natural Resources on Federal Parklands*: Federal projects involving the modification or alteration of natural resources should be evaluated by the Coastal Commission through the federal consistency review process.
- *Water quality*. The County encourages the Regional Water Quality Control Board, State Department of Health, and other responsible agencies to continue working on identifying sources of pollution in Tomales Bay and to take steps to eliminate them.
- *Stream alterations*. Stream impoundments, diversions, channelizations, or other substantial alterations shall be limited to those for (1) necessary water supply projects, (2) flood control projects where no other feasible method is available, and (3) developments where the primary function is the improvement of fish and wildlife habitat.

- *Stream Buffers*. Buffers to protect streams from the impacts of adjacent uses shall be established for each stream in Unit II. The stream buffer shall include the area covered by riparian vegetation on both sides of the stream and the area 50 feet landward from the on edge of the riparian vegetation. In no case shall the stream buffer be less than 100 feet in width, on either side of the stream, as measured from the top of the stream banks.
- *Development in Stream Buffers*. No construction, alteration of land forms or vegetation shall be permitted within such riparian protection area. Additionally, the stream buffer will extend a minimum of 50 feet from the outer edge of riparian vegetation, but no less than 100 feet from the banks of a stream.
- *Wetlands*. Wetlands in the Unit II coastal zone shall be preserved and maintained as productive wildlife habitats, recreational open space, and water filtering and storage areas. Allowable resource-dependent activities in wetlands shall include fishing, recreational clamming, hiking, hunting, nature study, bird-watching and boating. No grazing or other agricultural uses shall be permitted in wetlands except in those reclaimed areas presently used for such activities. A buffer strip 100 feet in width, minimum, as measured landward from the edge of the wetland, shall be established along the periphery of all wetlands.
- *Other Environmentally Sensitive Habitats*. Other sensitive habitats include habitats of rare or endangered species and unique plant communities. Development in such areas may only be permitted when it depends upon the resources of the habitat area.

Public Access and Recreation

- *General Policy*: The County of Marin supports and encourages the enhancement of public recreational opportunities and the development of visitor-serving facilities in its coastal zone. Such development must, however, be undertaken in a manner which preserves the unique qualities of Marin's coast and which is consistent with the protection of natural resources and agriculture. Generally, recreational uses shall be of low-intensity such as hiking, camping, and fishing in keeping with character of the existing uses in the coastal zone.
- *Policy on Public Access in Federal Parklands*: Additional coastal access trails and bike paths should be provided where feasible and where consistent with the protection of the parks' natural resources.
- *Bluff-Top Development*: Setbacks from the bluff above the old railroad right-of-way in the Giacomini Ranch's East Pasture shall also be required, consistent with LCP policies on bluff-top development.
- *Bike Paths*: The County supports the concept of a bike/pedestrian trail network in Unit II, connecting the villages and providing access to public parks. Several proposed routes have been discussed by West Marin residents and planning groups, but no final recommendation has been developed. In the absence of such a recommendation, the LCP (Marin County Comprehensive Planning Department 1981) assumes that the most likely location for a bike trail is along Highway 1 and Sir Francis Drake Boulevard. Therefore, to maintain the option for a roadside trail, 10-foot easements will be required for all development projects on either side of these roads. When a final route is agreed upon by the County, community, and concerned agencies and organizations, requirements for roadside easements will be modified to account for the new route.

Public Services and New Development

- *Transportation and Road Capacity*: Sir Francis Drake Boulevard provides a scenic driving experience for coastal visitors and an important access road for local residents. In order to protect its scenic rural character, the road shall be maintained as a two-lane roadway. Sir Francis Drake has adequate capacity to handle increased recreational and local traffic, although traffic patterns do occasionally create hazardous conditions for pedestrians and bicyclists in the areas of Inverness and Inverness Park.
- *Alternative Transportation*: The County strongly encourages the development of alternative modes of transportation, such as bicycle and pedestrian paths that are separated from the road, where possible.

- *Grading*: Any projects involving the movement of earth in excess of 150 cubic yards must adhere to LCP policies concerning minimization of earth movement, construction windows, erosion control and revegetation, and minimization of impervious surfaces.

Point Reyes Station Community Plan

As discussed earlier, the state requires each local planning agency such as the County of Marin to adopt a comprehensive, long-term plan for physical development of the region over which it has jurisdiction. Local planning agencies can decide to create separate community plans for individual communities within the general plan boundaries. In these areas, future planning decisions are based on both the general plan and the community-specific plan. The Point Reyes Station Community Plan was first developed in 1976 to provide guidance on current and foreseeable planning and land use issues based on community goals, objectives, and policies. It was later amended in 1986. Starting in 1999, the plan was revised again and was finalized in 2001. As noted earlier, the LCP takes precedence over all local policies and zoning, so the community plan must be consistent with the LCP (Marin County Comprehensive Planning Department 1981) to be valid (Marin County Community Development Agency 2001).

The plan establishes objectives and policies and programs for supporting or implementing objectives on a number of land use, socioeconomic, agricultural, and natural resource issues.

Natural Resources

- *Support for restoration of the former tidal marshes at the headwaters of Tomales Bay* to natural conditions and protection of the restored wetland in the future through review of development projects or construction activities in consultation with the Park Service and other relevant public agencies and incorporation of either impact avoidance or mitigation measures;
- *Preservation of the physical, ecological, and visual integrity of the bluff area located above the old railroad right-of-way* through the development review process establishment of a 100-foot buffer zone extended eastward from the eastern edge of the railroad grade;
- *Preservation of streams and streamside environments in their natural conditions*, including protection of existing riparian habitat or "buffers" and removal of invasive plant species;
- *Protection and restoration of Tomasini Creek* through allowing the downstream portion to resume its natural slough channel west of Mesa Road, thereby promoting recolonization by steelhead trout; and
- *Protection of Lagunitas Creek, specifically its water quality, coho salmon and steelhead populations, and other aquatic life*.

General Land Use

- *Zoning:* Proposed projects should not conflict with land-use related policies of Marin CWP, including land use designation or zoning standards.
- *Substantial Alteration in Character of Town*: There should not result in substantial alteration of the character or functioning of the community or present or planned future use of an area.
- *Increase in Recreational Demand*: Demand for neighborhood or regional parks or other recreational facilities should not be substantially increased.
- *Increase Density:* Proposed projects should not increase density that would exceed the official population projections for the planning area within which the Project Area is located as set forth in either the CWP or Community Plan.
- *Induce Substantial Growth*: Substantial growth should not be induced in an area either directly or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure).

Agricultural Land Use

Regulatory and Policy Setting

The federal Farmland Protection Policy Act (FPPA) is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that -- to the extent possible -- federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance, which is characterized primarily using soil types, as well as management regimes and other factors. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

National Resources Conservation Service (NRCS) uses a land evaluation and site assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of federally funded and assisted projects. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. A similar system has been developed for California by the State Department of Conservation, which oversees California's Farmland Monitoring and Mapping Program. This program was established in 1982 to assess the location, quality, and quantity of agricultural lands and conversion of these lands over time. FMMP is a nonregulatory program and provides an analysis of agricultural land use and land use changes throughout California every two years.

The California Land Conservation Act of 1965--commonly referred to as the Williamson Act--enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971. The Giacomini Ranch East and West Pastures are under Williamson Act Contracts, as are some of the adjacent ranches such as the Genazzi Ranch to the south and the Martinelli Ranch, now owned by the GGNRA. Olema Marsh is not under the Williamson Act, nor are the parcels at the dairy facility in Point Reyes Station and several commercial and residentially zoned parcels that are currently or formerly owned by the Giacominis near Inverness Park.

Because of the value of agriculture to Marin's economy and its scenic pastoral landscape, the County and Coastal Zone LCP (Marin County Comprehensive Planning Department 1981) have both identified maintenance of agriculture as a high priority.

Marin CWP

- The draft Marin CWP (1994) focused on protection of open space lands in the Coastal Recreational Corridor to preserve the "rural character, agriculture, and open lands
- Encourage agriculture and mariculture in the Coastal Recreational Corridor (CWP 1994).

Marin County Local Coastal Program Unit II

- *General policy*. Marin County intends to protect the existing and future viability of agricultural lands in its coastal zone, in accordance with Sections 30241 and 30242 of the Coastal Act. The County's LCP policies are intended to permanently preserve productive agriculture and lands with the potential for agricultural use, foster agricultural development, and ensure that non-agricultural development does not conflict with the rural character of the County's coastal zone.
- *Agriculture on Federal Parklands*: The continuation of agricultural land uses in the GGNRA and the Seashore is strongly encouraged, where and at a level which is compatible with the protection of natural resources and public recreational use.

- *Agricultural Production Zone*: Only permitted or conditional uses of lands, which includes wildlife refuges, will be allowed in the Agricultural Production Zone (e.g., lands zoned A-60).
- *Conversion of Agricultural Lands*: Projects should not conflict with general policies on agriculture in the Coastal Zone, specifically on agricultural conversions (Article 5. Sections 30241, Sections 30242).

Point Reyes Station Community Plan

- *Williamson Act Contracts*: Lands with agricultural or open space contracts should be preserved, and proposed projects should not cause conflicts with existing Williamson Act contracts.
- *Effect on Agricultural Resources*: Proposed projects should not have impacts to productive agricultural soils or lands with sufficient water resources.
- *Compatibility of Adjacent Land Uses with Agriculture*: Proposed projects should not negatively affect agricultural resources by creating incompatible land uses with adjacent protected lands).
- *Agricultural Viability*: Proposed projects should not affect agricultural operations such as viability of West Marin agriculture by decreasing productivity.

Regional Agricultural Land Uses

Agriculture has been an important part of West Marin culture since the mid 19th century (University of California 2006). In the early 1820s, Marin was settled by the Mexicans or Californnios, whose home base was the San Rafael mission (University of California 2006). The Mexicans raised thousands of longhorn cattle for their hides and tallow (University of California 2006). The cattle ran wild along with herds of native tule elk and were rounded up yearly by Mexican and Miwok vaqueros. After the mission was shut down in 1834, the land and the longhorns were divided up into vast ranchos (University of California 2006).

The Gold Rush of 1849 helped start the dairy industry (University of California 2006). In the 1850s, a San Francisco law firm owned most of the Point Reyes peninsula and established several very successful tenant ranches. They not only produced dairy products, but huge crops of fruit. At that time, most dairy operations were small, 10 to 15 cows, or as many as they could milk by hand (University of California 2006). Before refrigeration, all the milk produced was churned into butter. In 1862, Marin provided a quarter of California's butter (University of California 2006) and was considered one of the state's premiere dairy producers, with products commanding top dollar. Most of the ranches in the Point Reyes area specialized in dairying, cheese and butter production, although some moved into beef cattle ranching and artichoke farming.

Agriculture has been an important part of West Marin culture since the mid 19th century

Marin continues to support agriculture today, although its preeminence in terms of volume has waned, with the smaller West Marin agricultural operations unable to effectively compete against the extremely large operations in California's Central Valley. Animal operations, particularly dairies, produce generate the majority of agricultural revenue in Marin County (CWP, Marin County Community Development Agency 2005). In general, Marin County agriculture contributes a net surplus of $1.3 million annually to the county's general fund, and property taxes from agriculture generate another $10.3 million annually that are earmarked for other county funds, such as education (Strong Associates 2003). Local animal products include milk, beef, sheep, poultry, and eggs, with oysters, mussels, and clams being produced by the aquaculture industry (Marin County Community Development Agency 2005). Local farms also produce fruits, vegetables, wine grapes, flowers, nursery crops, wool, and hay, honey, and herbs (Marin County Community Development Agency 2005).

While most of the agricultural revenue still comes from animal operations, the number of dairies in Marin County decreased from 200 to 31 between 1950 and 2000, and the number of cattle dropped from 20,000 to 12,000 (Strong Associates 2003). Despite these decreases in ranches and cows, milk production in Marin has increased from 1.95 million pounds in 1964 to 2.25 million pounds in 2000, because of increased milk production per cow and other farming practice improvements (Strong Associates 2003). Reportedly, about 20

percent of the milk sold in the Bay Area comes from Marin dairies (Marin County Community Development Agency 2003). In addition, specialty products such as organic vegetables, grass-fed meats, olive oil, and farmstead cheese now supplement traditional farm income and have helped Marin to maintain an economic foothold in California's increasingly corporate-driven agricultural industry. Marin is considered a leader in organic agriculture, and local producers and support agencies are mounting a concerted effort to certify organic production and promote agricultural product diversification (Marin County Community Development Agency 2005).

As part of the CWP update, Marin County commissioned an agricultural economic analysis of the Marin County agricultural industry with a focus on land use. Dairies and livestock ranches still continue to cover most of the county's agricultural land in the County, while smaller areas of row crops occupy better soils, often in valley bottoms (Marin County Community Development Agency 2005). In contrast to the findings in 1973 that the largest threat to agricultural lands came from the potential of subdivision into suburban housing, the major issue facing agricultural lands today stems from gentrification or conversion into high value estate development (Strong Associates 2003). This conversion increases the costs of land ownership disproportionately higher than income earned from agricultural operations, thereby creating an economic disincentive for continuing to farm (Strong Associates 2003).

Geologic Resources

Subsidence and uplift along the San Andreas Fault have created a mosaic of topographic landforms that promotes wetland establishment, including steep ravines, depressional "sag" ponds along the fault, broad floodplains, lagoons, and even isolated lakes.

As with other vegetation communities, wetlands are ultimately products of geology. Geology provides the framework under which all other physical and biological forces such as water, sediment, climate, plants, and animals can interact, creating a hydrologically-driven vegetation community with special importance for both humans and wildlife. Nowhere is this more evident than in the Tomales Bay watershed. Tomales Bay and coastal Marin County have both an abundance and diversity of wetland types.

Geology has contributed to this abundance and diversity in a number of ways. Subsidence and uplift along the San Andreas Fault have created a mosaic of topographic landforms that promotes wetland establishment, including steep ravines, depressional "sag" ponds along the fault, broad floodplains, lagoons, and even isolated lakes. This fault-associated topography is juxtaposed against other geologic forces such as coastal erosion processes, which has, over the millennia, created wave-cut platforms. In combination with fault-associated uplift, coastal erosional processes have continually reshaped the northern California coastline and its associated wetlands through processes such as marine terrace building. These geologic forces have also produced a diverse array of hydrologic sources for wetlands, including tidal waters and abundant groundwater seeps and springs that serve as sources or "headwaters" for many of the bay's perennial and seasonal streams and marshes.

Geology even affects the duration of hydrology. Creeks draining off the granite-dominated Inverness Ridge tend to be perennial, while those flowing off Franciscan Complex Bolinas Ridge are seasonal or even ephemeral. The strong interaction between geology and wetlands is particularly visible within the Project Area. This relationship is discussed more in subsequent sections of this Chapter, including Water Resources and Vegetation Resources.

Geologic Resources within the Region and Project Area

The nature of the Project Area has been sharply defined by this region's unique geologic history. The sheer number of fault- and coastal erosion-associated features in this region such as trenches, shutter ridge, fault

sag ponds, stream offsets, marine terraces, folded shales, sea stacks, sea caves, and pillow basalt formations has created a wealth of unique geologic resources that draw both amateur and professional geologists to Point Reyes. The San Andreas Fault, responsible for the 1906 Earthquake that devastated San Francisco, runs directly through the Project Area and Tomales Bay. The San Andreas Fault is perhaps the best known fault in California, although there are more than 20-30 other faults in the San Francisco Bay region. "It is the most significant geological feature in the watershed, influencing the geology, topography and overall stability of the area" (TBWC 2003). The San Andreas Fault Zone (SAFZ) forms the active tectonic boundary between the northwestward-moving Pacific plate and the continental North American plate.

Tomales Bay is a relatively shallow estuary that has formed within the long, linear, submerged "rift" valley that has developed along the northwest-trending San Andreas Fault zone. The Bay was formed 15,000 to 5,000 years ago when it was inundated by rising sea levels from thawed ice at the close of the last ice age (Wahrhaftig and Wagner 1972)Through the millennia, tectonic uplift or subsidence associated with plate movement, combined with other influences such as glacial retreat, has shaped the northern California coastline, with oceanic influence alternately retreating or advancing into this fault-controlled valley. At one point, what is now known as the Pacific Ocean probably extended at least as far as Point Reyes Station and probably even further inland into the Olema Valley.

Interestingly, movement along this major strike-slip fault has apparently displaced lands by as much as several hundred miles. Clark and Brabb (1997) describe similarities between Eocene and Miocene depositional sequences of the Point Reyes Peninsula and the Santa Cruz Peninsula near Monterey, California. These similarities point to displacement of the Point Reyes Peninsula along the fault by as much as 280 miles (Prentice et al. 1991; Niemi and Hall 1996). Evidence suggests that, in the past 25 million years, the Point Reyes Peninsula has been moving northward at a rate of 2 inches per year (Stoffer 2005) San Francisco's 1906 earthquake, however, caused the Peninsula to shift 12-13 inches to the north in a matter of seconds (Shuford and Timossi 1989; Evens 1993). Recent research on the San Andreas Fault has allowed researchers to document the occurrence of 10 additional large-scale land movement events in the past 2,500 years, with a recurrence interval on the order of one major event every 250 years (Zhang et al. 2003).

The movement of the Pacific and Continental Plates has produced striking differences in the geologic nature of the lands on the west and east sides of Tomales Bay

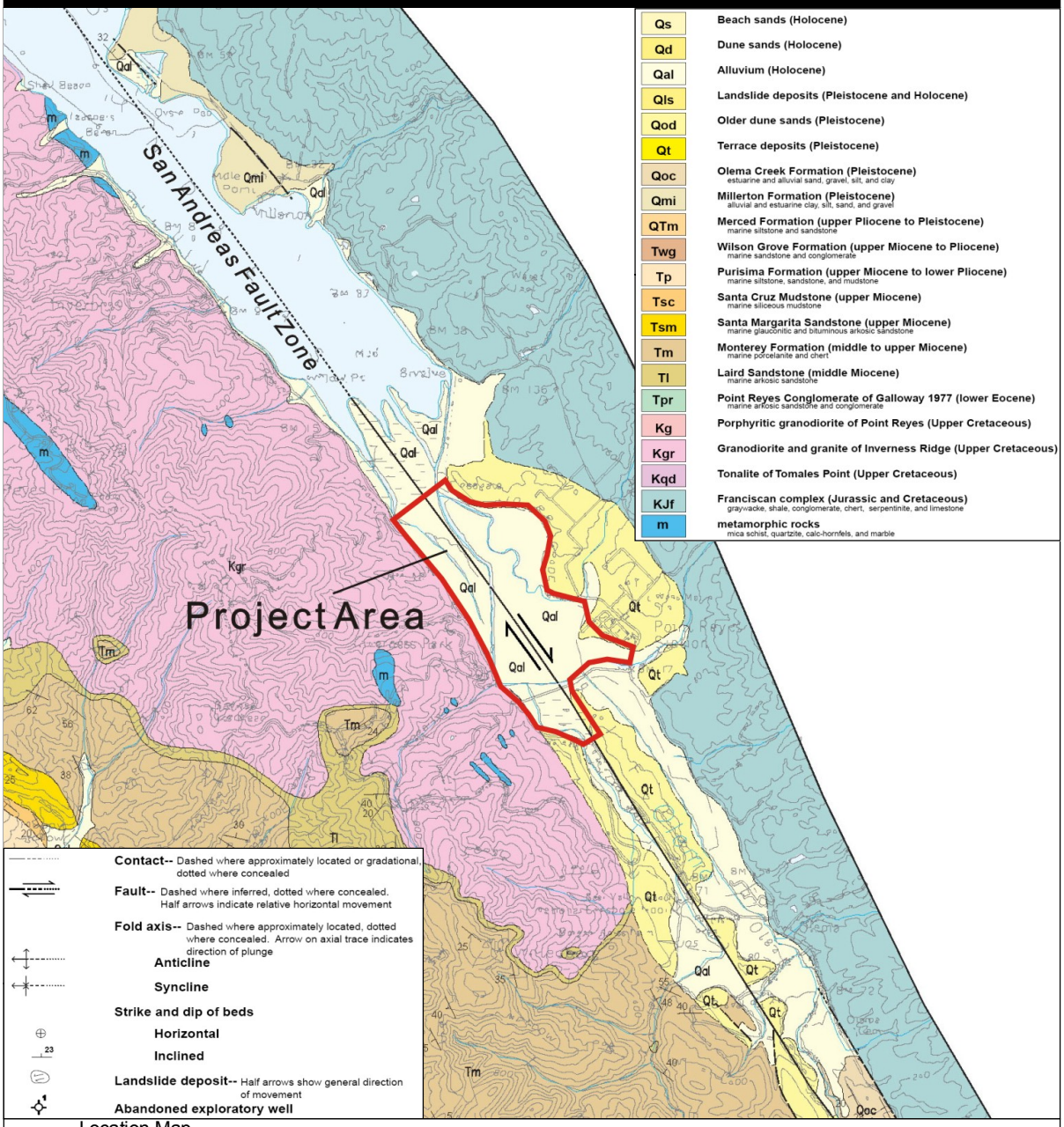
This movement of the Pacific and Continental Plates has produced striking differences in the geologic nature of the lands on the west and east sides of Tomales Bay. The eastern portion of the Tomales Bay watershed is dominated by the Franciscan formation (U.S. Soil Conservation Service 1985). Bedrock east of the fault (generally east of State Route 1) is the Franciscan Complex that makes up much of California's Coast Range. The Franciscan Complex is believed to be a fossil accretionary wedge of sediment that used to fill the trench of a subduction zone. It is mostly composed of greywacke, sandstone and shale with different grades of metamorphosis. Some parts of the Franciscan Complex are a mélange, including highly metamorphosed, low-grade mudstone, siltstone, and sandstone with occasional inclusions of limestone, chert, serpentinite, eclogite, and amphibolite conglomerate (Galloway 1977).

Between the Bay and the Franciscan Complex hills are low-elevation coastal marine terraces that run along the eastern perimeter of Tomales Bay (Figure 20). The Point Reyes Mesa, which borders the Project Area, to the east is a marine terrace. This prehistoric wave-cut terrace consists of unconsolidated sand, clay, and gravel of marine and non-marine origin (KHE 2006a). These marine- and non-marine materials also underlay the medial or "shutter" ridge that separates the Olema Creek and Bear Valley Creek drainage to the south (KHE 2006a).

West of Tomales Bay on the steeply sloped Inverness Ridge – and within most of the Seashore – granitic rock such as quartz-diorite and granodiorite dominate, forming the backbone of the Point Reyes Peninsula (USSCS 1985; Figure 20). Salinian granite underlies nearly the entire peninsula and is exposed in the areas of Inverness Ridge, Tomales Point, and the Point Reyes Headlands. The granite is unconformably overlain by the Monterey Shale in the southern part of the peninsula which is exposed along the coastline from Drakes Bay

Local Geology

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

Figure 20

Source: Local Geology map provided by Kamman Hydrology & Engineering, Inc.
San Rafael, California

south to Bolinas (Konigsmark 1998). Coastal wavecut benches and flooded valleys are the result of sea level fluctuations during the Pleistocene and Quaternary tectonic uplift (Scherer and Grove 2003). The Point Reyes plain, extending from Inverness Ridge west to the headlands is underlain by siltstone and mudstone of the Purisima Formation (Clark and Brabb 1997), which also occurs in the Santa Cruz Mountains.

The Project Area itself is mapped as Quaternary-aged alluvium (KHE 2006a; Figure 20). This alluvium includes stream-borne gravel, sand, silt, and clay, as well as estuarine clay and peat ((Niemi and Hall 1996; Knudsen et al. 1999). Underlying the relatively young Quaternary alluvium that blankets the Project Area is approximately 1000 feet of older interbedded estuarine and alluvial sediments of the Olema Creek Formation (Grove et al. 1995). The closest surface outcrop of this formation is seen within the fault zone approximately 5-miles south of the Project Area. Based on composition and sedimentary structure, the Olema Creek Formation is interpreted to consist of the intermixed fluvial delta and estuary deposits, similar to the modern deposits accumulating on the Lagunitas Creek delta. Packages of fine-grained overbank and back swamp deposits with abundant carbonaceous material are also common (Grove et al. 1995). The alternations between fine- and coarse-grained deposits of this formation reflect the combined influences of subsidence along the San Andreas Fault zone and climatic variations that affect sea level (Grove et al. 1995). Knudsen et al. (1999) report that rapid changes in sediment composition consisting of "mud-over-peat contacts" are commonly associated with an abrupt relative sea-level rise that accompanies earthquake-induced subsidence.

Topographic Resources within the Region and Project Area

Lagunitas Creek Watershed

The topography within the Project Area is controlled by Inverness and Bolinas Ridge and the dominant San Andreas Fault. The Olema Valley, extending from Bolinas Lagoon to Tomales Bay, is representative of this phenomenon. The Olema Valley ranges in width from 1,500 to 7,000 feet and includes a variety of fault-associated topographic features including linear ridges and drainage patterns, parallel stream systems, offset rows of trees and fences, and a series of sag ponds. Most of the watersheds within the Olema Valley have drastically altered and unusual drainage patterns associated with the combination of stream capture and alterations to the topography caused by the strike-slip movement of the San Andreas Fault. Near their headwaters, Olema Creek and Pine Gulch Creek run parallel, but in opposite directions for nearly 2 miles. Near the head of Tomales Bay, Bear Valley Creek drains at an acute angle from Inverness Ridge (likely valley capture) and makes an abrupt turn to the north adjacent to the 1906 fault rupture, running parallel to Olema Creek until they both discharge into the Lagunitas Creek. The 120-foot medial or shutter ridge separates the two creeks (KHE 2006a).

Uplift associated with fault movement has created some relatively steep topography adjacent to the Project Area. Inverness Ridge forms the backbone of the Point Reyes Peninsula, reaching a height of 1,407 feet at Mount Wittenberg. The ridge is characterized by relatively consistent upland elevation with overly steep headwater stream systems. The only interruption in the ridge between Bolinas and Tomales Point is the 400-foot pass at Divide Meadow. Bolinas Ridge to the south of the Project Area in Olema Valley rises to approximately 800 feet in elevation. Sea level rise and retreat has created marine terraces directly east of the Project Area on the Point Reyes Mesa, with elevations ranging from 30 feet at the southern end near the Giacomini Ranch dairy facility to 80- to 100 feet above mean sea level at its northern end near Tomasini Creek (KHE 2006a).

Surface rupture in Olema, 1906

Giacomini Ranch

Prior to 1862, a substantial amount of the Giacomini Ranch was actually open water and intertidal mudflats, with the historic coastal salt marsh concentrated in the eastern portion of the Giacomini Ranch, Olema Marsh, and the mouth of Olema Creek (PWA et al. 1993, Niemi and Hall 1996; Figure 21). This marsh complex represented a significant percentage of the existing salt marsh present at that time in Tomales Bay, with tidal influence at that time believed to extend as far south as Bear Valley

during extreme storm tides (Evens 1993). However, during the latter half of the 19th century, sedimentation rates rose dramatically, resulting in rapid deltaic aggradation of coarse alluvium in the southern end of Tomales Bay (Figure 21). This increase in sedimentation probably resulted from an increase in logging and other changes in land use practices (PWA et al. 1993, Niemi and Hall 1996), but was undoubtedly exacerbated by the geologic instability characteristic of this region. It has been estimated that, between 1860 and 1950, approximately 5 vertical feet of sediment deposited within southern Tomales Bay (PWA et al. 1993). Acreage of wetlands within Tomales Bay almost doubled between 1863 and 2001 to 944.2 acres (Parsons et al. 2004), and the Lagunitas Creek delta more than doubled in acreage and length during this period, with the tip of the delta extending approximately another 2,100 feet beyond its 1863 boundaries by 2001. The greatest sedimentation occurred between 1860 and 1910 (PWA et al. 1993; Figure 21).

The 1906 earthquake may have subsequently "drowned" some of this deltaic aggradation. The surface rupture caused by the 1906 earthquake extended from Bolinas Lagoon to Tomales Bay, with lateral displacement ranging from 14 to 20 feet in the Olema Valley (Gilbert 1908)Levee Road reportedly was offset 20 feet over a zone of faulted ground that was 50 to 60 feet wide. In addition, the roadway embankment within the fault zone reportedly settled as much as 3.5 feet. The surface rupture of the earthquake extended across the Project Area and reportedly was marked by an approximately 50-foot-wide, 18-inch-deep depression in the tidal marshes along the northeast side of the fault (Lawson 1908; Youd and Hoose 1978). Within the Lagunitas Creek delta, sag portions of the trace often appeared as "water lanes:" indeed, the "water lane" depicted as occurring directly north of the Giacomini Ranch in the undiked marsh corresponds almost exactly to the location of an existing, extremely straight tidal marsh channel. During the earthquake, a large portion of the Lagunitas Creek delta "was thrown … into gentle undulations, the difference in height between the swells and hollows being usually less than a foot" (Gilbert 1908). The undulations were not observed along the eastern shore of the bay or in the "the firmer part of the Papermill delta…" (Gilbert 1908). The horizontal shifting of the mud flats occurred over an approximate distance of 1.5 miles along the western margin of the bay, with the observed northern limit near the town of Inverness. Wave action gradually smoothed out the ridges and troughs, but some of the larger troughs remained, ranging in height from 1 to 3 feet or more (Gilbert 1908). This undulation may explain some of the localized losses of salt marsh habitat that were reported within Tomales Bay (Gilbert 1908).

Despite the earthquake, sedimentation and deltaic aggradation continued to be high until at least the 1950s, when construction of several dams and reservoirs began to curtail sediment delivery (Figure 21). These dams include the Peters and Lagunitas Dams, which control about 70 percent of the Lagunitas Creek watershed (PWA et al. 1993). By the early 1940s, rapid sedimentation had converted this marsh from the tidally dominated system depicted in the 1863 map to a fluvial or creek-dominated one, with remnants of the tortuously meandering sloughs once present and characteristic of tidal systems restricted to the eastern perimeter of what would become the East Pasture. The rapid delta formation at Lagunitas Creek encouraged the Giacominis to dike approximately 550 acres of the historic and newly created marsh in 1946 for creation of the Giacomini Ranch. Since diking, topography of the Giacomini Ranch has largely been affected by land-leveling activities, efforts to re-direct flood and creek/drainage flows, and sediment deposited during flooding. Elevation of the levees is highly variable due to maintenance activities and erosion- and cattle-related degradation.

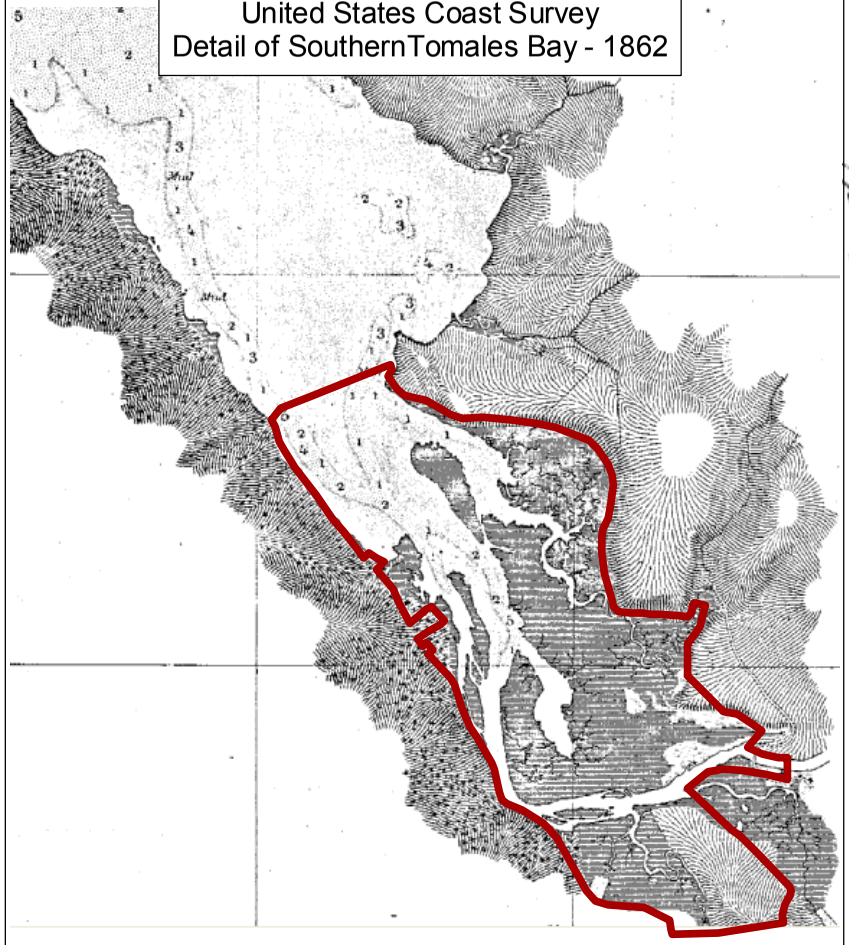
Displacement of Levee Road following 1906 earthquake

The topographic map prepared by the (USGS 2003b) indicates that the majority of the active pasturelands are relatively flat, having an average elevation of 4-feet NAVD88 in the East Pasture and 5-feet NAVD88 in the West Pasture (KHE 2006a). The highest ground elevations (up to about 30-feet NAVD88) occur at the Giacomini Dairy facility in the southeast corner of the Ranch (KHE 2006a). The lowest elevations on the map (about 0-feet NAVD88) correspond to bed elevations in interior drainage channels in both the East and West Pastures and portions of Lagunitas Creek

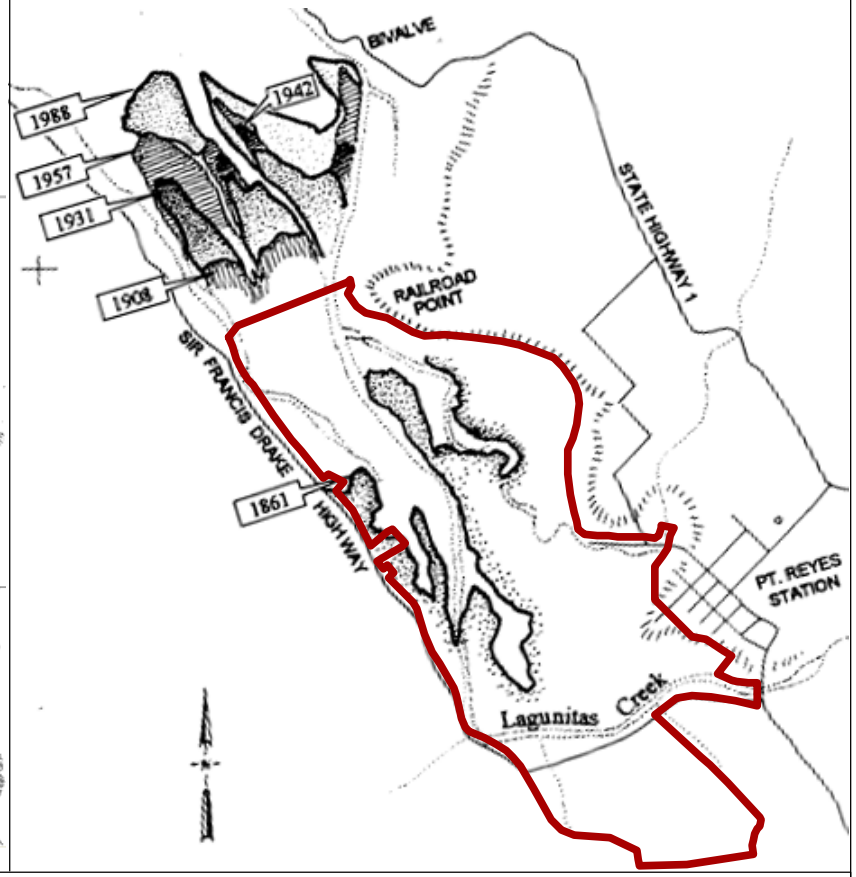
Historic Map of Southern Tomales Bay

Giacomini Wetland Restoration Project

United States Coast Survey
Detail of SouthernTomales Bay - 1862



Expansion of Lagunitas Creek Delta
Location of Marsh Edge from 1861-1988



National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

Source: Maps provided by Phillip Williams and Associates, Ltd., 1993
San Francisco, California

PWA
PHILIP WILLIAMS & ASSOCIATES, LTD
ENVIRONMENTAL HYDROLOGY

Figure 21

between the two pastures (KHE 2006a). In general, the East Pasture is highest along the south margin (11- to 16 feet NAVD88) and slopes down to the average pasture elevation of 4-feet approximately at a distance of approximately one-quarter of the pasture length to the north (KHE 2006a). This sloping surface is part of two similar geomorphic features, one being the face of a natural alluvial fan building out onto the historic marsh plain from the mouth of Lagunitas Creek and the other being a wedge of fine grained sediment splayed onto the East Pasture through a low spot in the levee during repeated flooding (KHE 2006a). The East Pasture is essentially flat over its northern three-quarters (KHE 2006a).

The east half of the West Pasture (located immediately west of the Lagunitas Creek levee) slopes gently and evenly from approximately 8-feet NAVD88 at the south end to 5-feet NAVD near the North Levee (KHE 2006a). Ground surface elevations along the western margin of the West Pasture and along Sir Francis Drake Road range from 14-feet NAVD88 (at the south end) to 21-feet NAVD88 (at the north end; KHE 2006a). Topography is heavily influenced by alluvial fans that have formed at the mouths of several creeks that discharge onto the West Pasture along the base of Inverness Ridge (KHE 2006a). The crest of the West Pasture levee averages about 12 feet NAVD88 in elevation at the south end and 10 feet NAVD88 at its intersection with the north levee (KHE 2006a). The north levee of the West Pasture has an average elevation of approximately 10 feet NAVD88. Along this same span, the East Pasture levee crest is typically about 2 feet lower in elevation than the West Pasture levee (KHE 2006a). Concrete spillways approximately 180-feet long with crest elevations around 7.5-feet NAVD88 occur at the north end of both the East and West Pastures (KHE 2006a). These structures are designed to drain seasonal floodwaters from each pasture.

Topographic information collected by the USGS suggests that, unlike San Francisco Bay marshes, diking in the Project Area has not resulted in extensive subsidence or lowering of elevations within the Giacomini Ranch. In San Francisco Bay, marshes largely developed from organic- or peat-rich clay materials that rapidly compacted once levees were constructed between the 1860s and 1960s. The base elevation of diked marshes in San Francisco Bay is often 7- to 12- feet below that of undiked areas, and subsidence is even greater in the Sacramento Delta, often ranging between 15- to 20-feet.

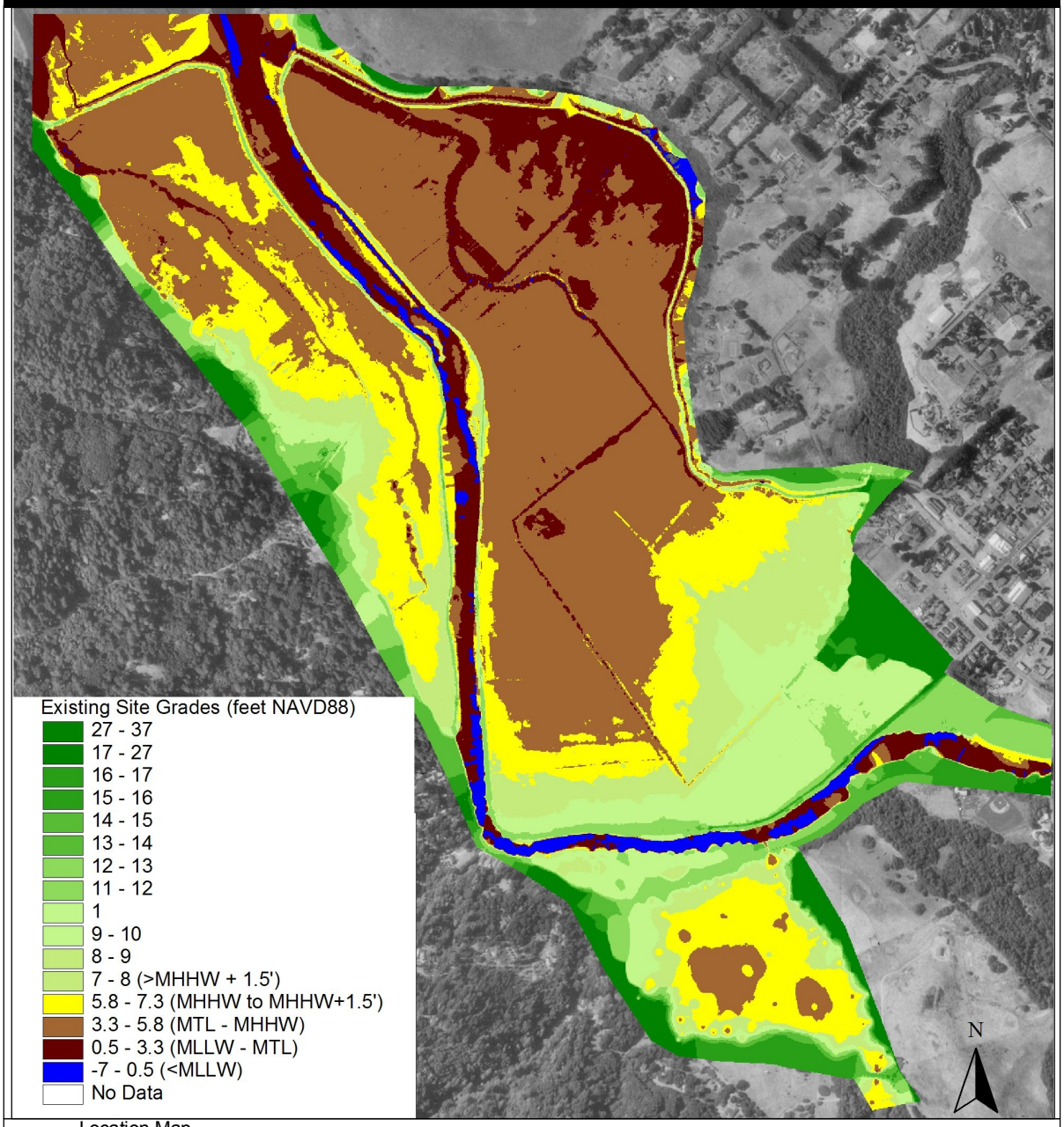
Conversely, along the outer San Francisco Bay coast, there was a period of rapid marsh formation in the late 1860s and early 1900s in response to increased sedimentation within watershed tributaries. Many of these "young" marshes were largely composed of low-organic coarse alluvial mineral soils that have compacted little, if at all, if and when these marshes were diked (Parsons et al. 2004). Elevations of the adjacent undiked marsh to the north of the Giacomini Ranch range from +3 (low marsh) to +7 feet (high marsh/upland ecotone) NAVD88, with the marsh plain at approximately +5 to +6 feet NAVD88 (USGS 2003b). This information suggests that elevations behind or inside the levees have decreased, at most, 1 foot at the northernmost portions of the Giacomini Ranch and have aggraded within the southernmost portions. Some of the aggradation may result from land leveling and deposition of fill and manure, but the Giacominis also removed the southwestern portion of the East Pasture levee deliberately to preferentially direct flood flows into this portion of the property (KHE 2006a). This dynamic is illustrated in Figure 22, which shows higher elevation areas that would not be subject to tidal flooding even if levees were not present in green: Subtidal and lower intertidal areas exist only in existing creeks, sloughs, and ditches.

Olema Marsh and Lower Bear Valley Creek

A 2004-2005 series of topographic surveys of Olema Marsh and lower Bear Valley Creek also revealed that elevations were higher than originally anticipated, at least in Olema Marsh. The center of Olema Marsh ranged in elevation from approximately +4 - to +8 feet NAVD88 (KHE 2006a). Meanwhile, the elevations of the adjacent Levee Road range from +11- to +13 feet NAVD88, approximately the same elevation as the county's White House Pool park on the north side of Levee Road (KHE 2006a, USGS 2003b). Upstream of Olema Marsh, lower Bear Valley Creek gradient remains flat for 3,000 feet upstream of Olema Marsh and then starts rising gently with a 1 percent grade to the Seashore's maintenance facility area (KHE 2006a).
In 1982, Bear Valley Creek underwent some very dramatic topographic changes as a result of the 1982 flood, a 100-year storm, and clean-up efforts from debris flows after the storm. Prior to the storm, the middle and lower portions of the Bear Valley Creek channel had become deeply incised. During New Year's, 1982, a rainfall total of 11-20 inches was recorded within 24 hours. As a result of these excessive rains and high soil saturation, many of the drainages originating from Inverness Ridge broke loose, resulting in catastrophic debris flows (Ellen et al. 1988). Debris flows originating in the two major tributaries of Bear Valley Creek carried into the mainstem of Bear Valley Creek, choking the former channel, scouring existing road/trail

Intertidal Elevations

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

Figure 22

Source: Kamman Hydrology & Engineering
San Rafael, CA

facilities, and turning the colluvial valley bottom into a sandy, braided stream channel with extensive woody debris jams that acted to temporary dam and pond waters within the channel. The lower portion of Bear Valley Creek rapidly went from an incised channel with steep creek banks and no connection to the adjacent floodplain terrace to a swampy marsh that, in some areas, has no defined channel.

Interestingly, the higher-than-anticipated elevations within Olema Marsh do not appear to be related to excessive sedimentation following the 1982 flood or the smaller, but still significant 1998 flood, as was expected (KHE 2006b). The lower section of Bear Valley Creek appears to be comprised entirely of peat derived from tules and cattails that is at least 10 feet deep (KHE 2006a). The flattening of the valley gradient and the berm effect caused by Bear Valley and Levee Roads has contributed to an increase in water residence time and water depth in the lower Bear Valley reaches. Persistent ponding within the creek and marsh encourages build-up of peat within lower Bear Valley Creek and Olema Marsh by precluding oxidation of organic matter, which may be causing marsh surface elevations to increase and contributing to the increase in water depth. Sedimentation that has occurred in Olema Marsh appears to be due more to anthropogenic activities. A large rectangular swath of land within the northern portion of the marsh appears to have been graded and leveled along Levee Road, obliterating some of the remnant slough channel features that were still apparent in 1961 aerial photographs (KHE 2006b).

The central portion of Olema Marsh lies at an elevation between 4- and 6-feet NAVD88 (KHE 2006a). The marsh plain elevation upstream of Bear Valley Road starts at approximately 6-feet (NAVD88) and gradually slopes upward for a distance of 1600-feet to an elevation of approximately 9-feet NAVD88 (KHE 2006a). Moving upstream of this point, the valley bottom steepens, and the creek channel occupies a well-developed channel within a broad floodplain. There are no levees on the south side of Lagunitas Creek between Green Bridge and White House pool to protect Levee Road or existing residences from flooding. As its name implies, Levee Road acts as a levee itself. The crest of Levee road is concave in shape, with roadway high points of 12.5- and 13.2-feet NAVD88 at the east and west ends where it borders Olema Marsh and falling to 11.6-feet midway in between. Similarly, Bear Valley Road is an earthen berm with 60-foot top-width, bisecting a lower portion of Bear Valley Creek and bordering the south- and western margins of Olema Marsh.

Crest elevation of Bear Valley Road range from 15.6- to 14.6-feet NAVD88 and is approximately 7- to 8-feet above the marsh plain surfaces in lower Bear Valley Creek and Olema Marshes.

Geologic Resource Issues - Geologic Hazards

Regulatory and Policy Setting

The devastating impacts of large earthquakes on urban and rural communities and potentially even parks have led to development of various Park Service, state, and local policies and regulations that are aimed at minimizing risks to residents and visitors. Within California, several policies and regulations apply to geologic hazards and geotechnical practice in the San Francisco Bay region. These include the California Alquist-Priolo Earthquake Fault Zoning Act, the Seismic Hazards Mapping Act, the Uniform Building Code, as well as county regulations that address geologic hazards as they relate to grading and construction activities.

While the Park Service is charged to preserve geologic processes "unimpaired," natural geologic processes "can be hazardous to humans and park infrastructure," so park managers must strive to understand future hazards and, once understood, "minimize their potential impact on visitors, staff, and developed areas" (NPS 2001, Section 4.8.1.3). Management policies also direct the Park Service to "try to avoid placing new visitor and other facilities in geologically hazardous areas" (NPS 2001a, Section 4.8.1.3).

California's Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code Section 2621 et seq.) prohibits the location across the traces of active faults of most types of structures intended for human occupancy and strictly regulates construction in corridors along active faults (earthquake fault zones). The Act is intended to reduce the hazard to life and property from surface fault ruptures during earthquakes. It also defines criteria for identifying active faults and establishes a process of review for building proposals in and adjacent to earthquake fault zones. Under the Alquist-Priolo Act, faults that are characterized as "sufficiently active" and "well-defined" are zoned differently, and construction in these zones is regulated more stringently. A fault is defined as "sufficiently active" if one or more of its segments or strands show evidence of surface displacement during Holocene time (approximately the last 11,000 years). The San Andreas Fault Zone

(SAFZ) is the only known on-land "active fault" and only zoned fault within the boundaries of Marin County (Snyder and Smith Associates Inc. and Nichols-Berman 2002). Local agencies are responsible for regulating construction within Alquist-Priolo Zone, including all land divisions and most structures for human occupancy except single family wood-frame and steel-frame dwellings up to two stories that are not part of a development of four or more units (California Geological Survey 2006). Cities and counties cannot approve development unless a geologic investigation is performed by a licensed geologist.

While the Alquist-Priolo Act specifically addresses hazards associated with surface fault rupture, the Seismic Hazards Mapping Act of 1990 (California Public Resource Code Sections 2690-2699.6) specifically focuses on other hazards related to earthquakes such as ground shaking, liquefaction, and seismically induced landslides. Through this Act, the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards. Cities and counties are required to regulate development in mapped seismic hazard zones through requiring appropriate site geologic and soil investigations and mitigation measures as part of permit review. Further support for review of construction within geologically hazardous areas comes from the State of California's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC: CCR Title 24).

The LCP for Zone II, in which the Project Area is located, states that in Alquist-Priolo Zones, earthquake hazard zones, and areas subject to liquefaction, landslides, bluff erosion, and steep slopes averaging greater than 35 percent, proposed projects will be "required to demonstrate that the area of construction is stable for development, the development will not create a hazard or diminish the stability of the area, the" (Marin Community Comprehensive Planning Department 1981). Furthermore, the Coastal Resources and Management Policies requires that proposed projects in the Coastal Zone must "minimize risks to life and property in areas of high geologic…hazard" (Section 30253). The Point Reyes Station Community Plan (Marin County Community Development Agency 2001) also has developed policies relating to changes in topography that might affect geologic substructures or unstable soil conditions or unique geologic or physical features.

Geologic Hazards within the Project Area

Earthquakes. As described earlier, the Project Area is particularly vulnerable to geologic hazards due to being sited directly on the San Andreas Fault, certainly one of the most famous, if not necessarily the most active, of California's faults.

During the last 160 years, the San Andreas Fault system has produced numerous small-magnitude and a dozen moderate to large (magnitude>6) earthquakes in the San Francisco Bay Area (USGS 2003a) although there have been no extremely large earthquakes on the northern section of the fault since 1906. The Loma Prieta earthquake, the most recent catastrophic event in the Bay region of the SAFZ, occurred in 1989 in the Santa Cruz Mountains approximately 8.7 miles north of Santa Cruz. It caused tremendous damage, including collapse of a portion of the Oakland Bay Bridge. The San Andreas Fault is the only fault within Marin County mapped as being in an Alquist-Priolo Earthquake Hazard Zone, and the boundaries of this "zone" incorporate the Project Area (Figure 23).

The San Andreas Fault is not the only active fault in the Point Reyes area (Figure 23). The Project Area is also located near the offshore Point Reyes fault, which is identified as a Type B seismic source1 by the current Uniform Building Code (UBC) (International Conference of Building Officials 1997), although it is not zoned by the State of California. The San Gregorio Fault runs in the ocean from Santa Cruz to Point Reyes. The northern extent of the North Hayward fault is located a considerable distance east of the Project Area in the eastern portion of San Francisco Bay. The Rodgers Creek fault, which is the likely northward continuation of the North Hayward fault trend, is located in Sonoma County 25 miles northeast of the Project Area. Both of these faults are zoned by the state and are identified as a Type A seismic source by the UBC (Hart and Bryant 1997; International Conference of Building Officials 1997). Table 4 summarizes current estimates of the maximum earthquake anticipated on the principal active faults in the vicinity of the Project Area.

1 The UBC evaluates the risk associated with active faults based on their potential to generate large earthquakes (measured as the moment magnitude for the largest earthquake anticipated on the fault) and their degree of seismic activity (measured as average annual slip rate). Under this system, a *Type A seismic source* is a fault that is capable of producing large-magnitude events ($\geq$ M 7.0) and is highly active (has a high average annual slip rate). A *Type B seismic source* is associated with smaller maximum event and/or is less active, but still constitutes a substantial seismic threat (International Conference of Building Officials 1997).

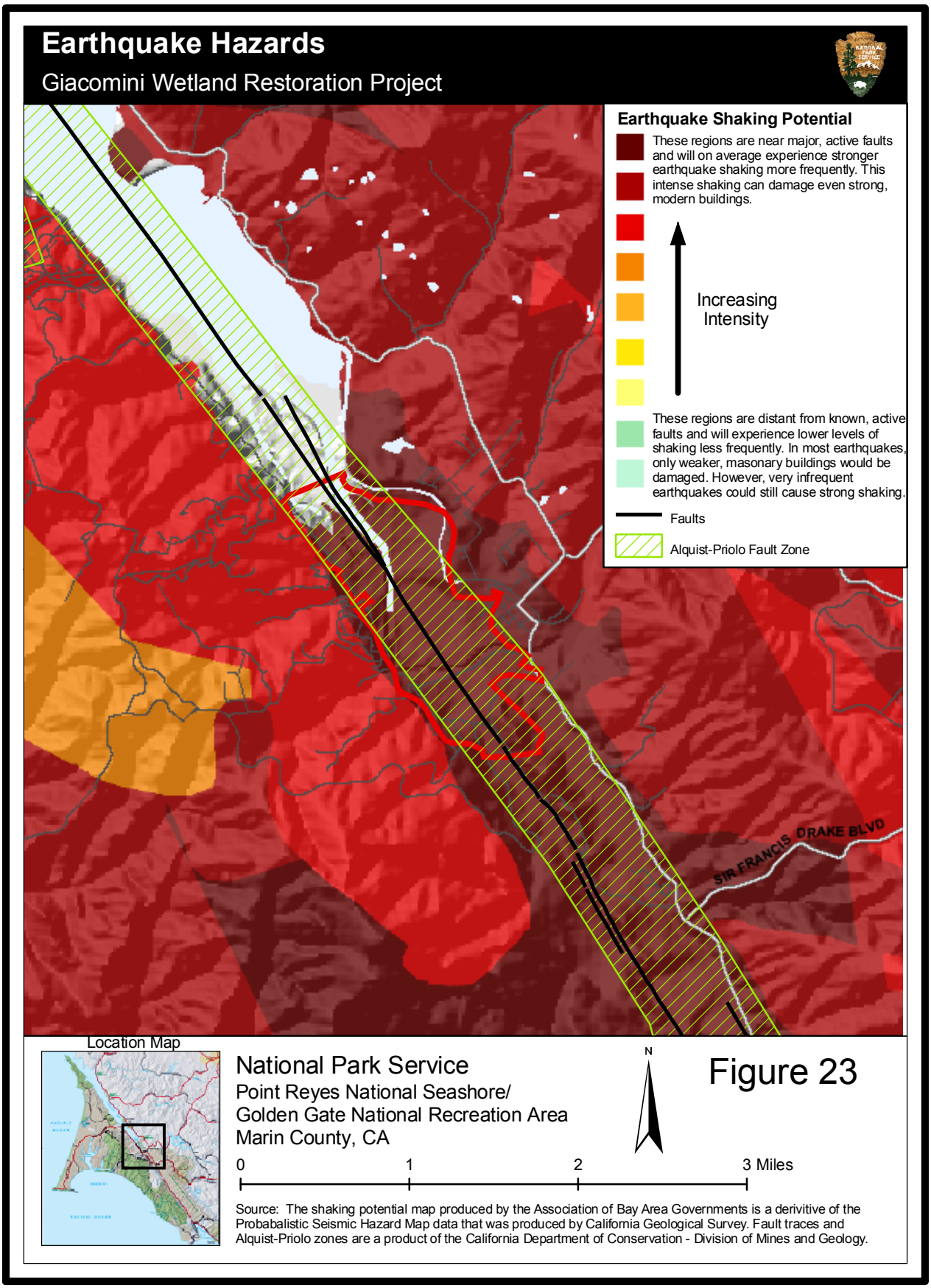

Earthquake Hazards
Giacomini Wetland Restoration Project
Earthquake Shaking Potential
These regions are near major, active faults and will on average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings.
Increasing Intensity
These regions are distant from known, active faults and will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonary buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking.
Faults
Alquist-Priolo Fault Zone
SIR FRANCIS DRAKE BLVD
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
Figure 23
0
1
2
3 Miles
Source: The shaking potential map produced by the Association of Bay Area Governments is a derivitive of the Probabalistic Seismic Hazard Map data that was produced by California Geological Survey. Fault traces and Alquist-Priolo zones are a product of the California Department of Conservation - Division of Mines and Geology.

TABLE 4. MAXIMUM EARTHQUAKE ANTICIPATED ON MAJOR FAULTS IN VICINITY OF POINT REYES NATIONAL SEASHORE

Fault	Estimates of Maximum Earthquake	Estimated Mean Recurrence Interval[b]
San Andreas (northern segment)	7.9[a] 7.45[b]	223 years
Rodgers Creek	7[a] 6.98[b]	205 years
Point Reyes	6.8[a]	Unknown

Sources: [a]International Conference of Building Officials 1997, [b]U.S. Geological Survey Working Group on California Earthquake Probabilities.

Geologists have found that earthquakes do not occur randomly, but rather are clustered, because as strain is released in one area, it may actually increase in another (USGS 2003a). This clustering has led geologists to estimate that the probability of an earthquake of magnitude 6.8 or larger occurring during the next 30 years in the San Francisco Bay region is approximately 62 percent (USGS 2003a). The probabilities of an earthquake with a magnitude greater than 6.7 between 2000 and 2030 are 21 percent for the San Andreas Fault and 32 percent for the Hayward-Rodgers Creek fault (USGS 2003a).

Earthquakes are associated with several major hazards: ground shaking, surface fault or ground rupture, ground failure (e.g., liquefaction, settling, and lurching), landslides, and inundation from tsunamis or tidal waves or waves in enclosed water bodies such as lakes and reservoirs. The potential for a surface fault rupture or ground rupture is limited to areas along the fault or within 250 feet of the fault, which means that the risk of surface fault rupture is extremely high, as the Project Area lies directly over the San Andreas Fault. The risk for tsunami or tidal wave might be considered high, as well. Tsunamis are long period waves that are typically caused by underwater disturbances such as landslides, volcanic eruptions, or seismic events. Areas highly susceptible to tsunamis are low-lying coastal areas such as tidal flats, marshlands, and diked areas that are still at or near sea level. However, the Point Reyes Peninsula and the distance of the Project Area from the mouth of the Bay afford it protection from tsunami-causing events in the open ocean (Anderson Consulting Group 2000; EDAW Inc. 2001).

In general, the destructiveness of earthquakes to humans namely, injury, loss of life, and property damage, are influenced by epicenter proximity, earthquake magnitude, a given structure's resistance to earthquakes (e.g., modern structures are constructed so that they flex during earthquakes), and the substrate or geologic materials upon which a structure is built. The Modified Mercalli Intensity Scale is an earthquake shaking intensity scale based on local effects experienced by people, structures, and earth materials based on the damage and havoc created during the 1906 earthquake. Created in 1931, this scale ranges from I, which is an event not felt by people to XII, which are events that cause general panic and total damage. The 1906 earthquake produced ground shaking of Modified Mercalli Intensity VIII to IX in the vicinity of the fault (Wald et al. 1993). Because of its proximity to an active fault, the Project Area has been characterized as occurring in an area with a Mercalli Intensity Shaking Severity Level of X, which are events that are Very Violent (Association of Bay Area Governments (ABAG) 2003). The Earthquake Hazard rating for the Project Area was also the severest one possible (ABAG 2003; Figure 23), classified as regions are near major, active faults that will on average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings.

In addition to proximity, substrate also plays a crucial role in determining the amount of destruction caused by earthquakes. For example, while the 1906 earthquake is often referred to as the San Francisco earthquake, the city of San Francisco does not directly straddle the San Andreas Fault. One of the reasons that the 1906 earthquake was so destructive in San Francisco is that much of the city was built upon imported sand fill that became unstable during plate movement. Loose, saturated materials such as sands can become fluid-like during an earthquake, suddenly losing strength and behaving almost like quicksand. This phenomenon, called liquefaction, typically occurs where groundwater is shallow and the substrate is clean, poorly consolidated, loose sand. Other phenomena include ground lurching or horizontal movement of ground located adjacent to slope faces and lateral spreading, horizontal displacement of soil that occurs in loose, unconfined sedimentary and fill deposits.

Seismic hazard maps have not been issued for the any of the quadrangles in the vicinity of the Project Area (California Geological Survey 2004). However, generalized liquefaction hazard level mapping available characterizes the liquefaction hazard level or susceptibility within the Project Area as being High (ABAG 2003; Figure 24) or Very High (Knudsen et al. 2000). The Project Area occurs within what has been mapped as Quaternary alluvium, which consists of stream-borne gravel, sand, silt, and clay, as well as estuarine clay and peat (Knudsen et al, 1999, Niemi and Hall 1996). The groundwater table beneath the entire Project Area is very shallow, often within 1-4 feet of the ground surface even during the summer (NPS, unpub. data). Bedrock was not encountered within any of the shallow soil borings conducted by KHE (2006a).

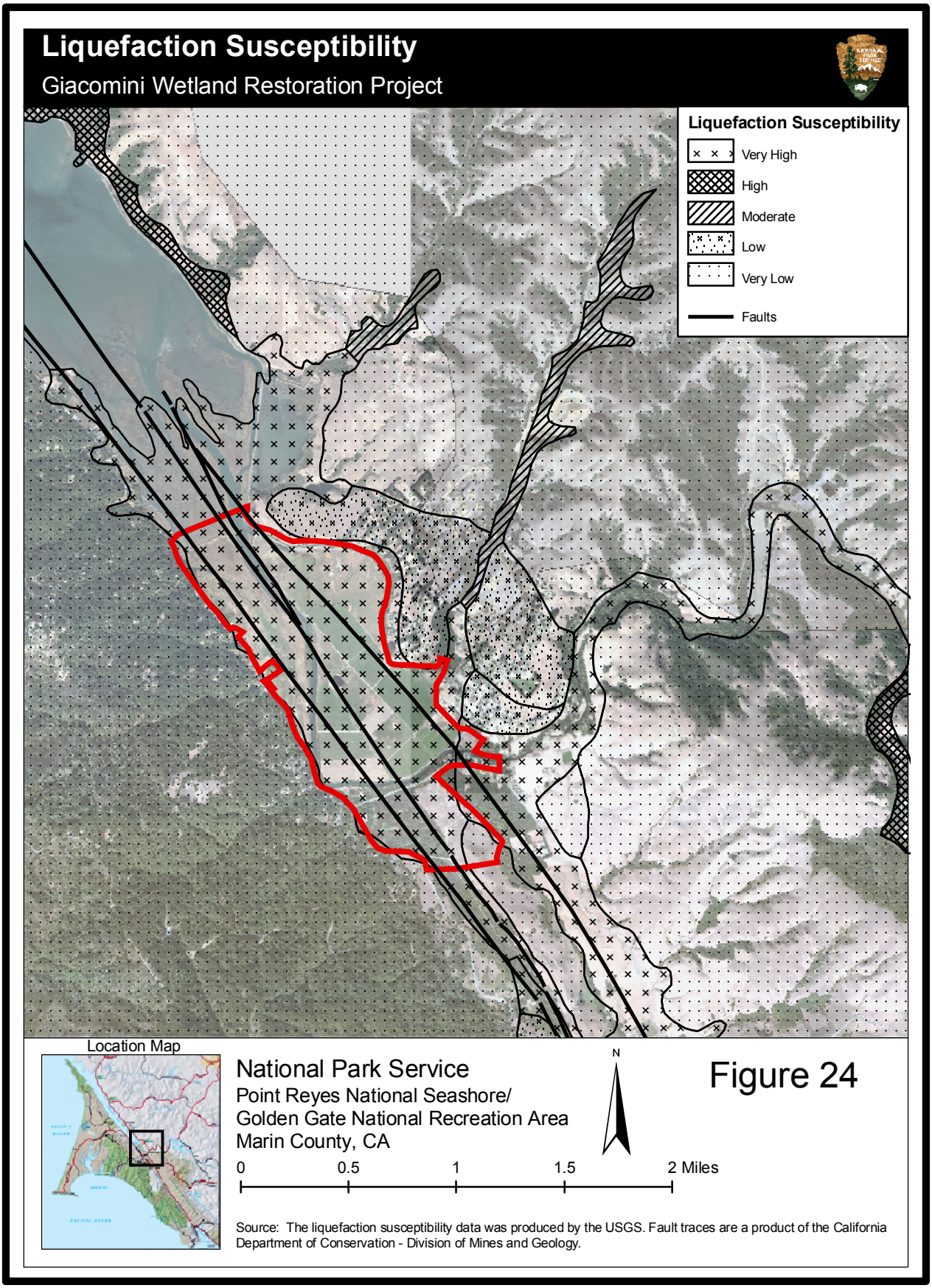
At least six liquefaction events have been documented within the Project Area in the past, most of which involved cracks in the ground without other effect, although one instance included lateral spread and ground settlement (Youd and Hoose 1978). Not only is this type of substrate subject to liquefaction, but it tends to amplify the energy of earthquakes. The National Earthquake Hazards Reduction Program (NEHRP) has defined five soil types on the basis of their shear-wave velocity or the velocity at which the rock or soil transmits shear waves. Shaking is stronger where the shear wave velocity is lower. Because the Project Area contains water-saturated mud and artificial fill, it has been mapped as having velocities of less than 200 m/sec, which would provide the strongest amplification of shaking (ABAG 2003).

The seismic hazard conditions present in the Project Area also have implications for the integrity of earthen structures such as levees, which are more prone to failure or breaching when near an earthquake fault or in areas that are rated as having high susceptibility to liquefaction, ground lurching, or settlement. Ground shaking is the primary cause of earthquake damage to human-made structures, including levees.

Landslides. Landslides can be induced by both earthquakes and excessive rainfall. While the Seashore and north district GGNRA lie on one of the more infamous North American faults, the recent physical history of this area appears to have been influenced more by watershed-scale sediment movement precipitated by either anthropogenic disturbance or natural, catastrophic flooding. As discussed earlier, denuding and ground disturbance associated with logging, agriculture, grazing, and other settlement activities appears to have destabilized already unstable hillslopes that subsequently increased the potential for erosion and landslides during moderate to large rainstorms. This sediment then washed down from the upper portions of the watershed into the mouth of Tomales Bay, forming the Lagunitas Creek delta. Since then, natural flood or other catastrophic events such as the 1982 (100-year), 2006 (30-year), and 1998 (10-year) floods and the 1996 Mt. Vision fire has continued to shape Tomales Bay and the Lagunitas Creek subwatershed, particularly the lower Bear Valley Creek and Olema Marsh areas (Anima et al. 1988). Each of these events led to mobilization of enormous amounts of sediment from landslides within the Seashore's watersheds, including the Lagunitas Creek, Olema Creek, and Bear Valley Creek watershed.

The danger from landslides is directly related to the geologic stability of the surrounding landscape. The Franciscan Complex, which runs along the eastern portion of the Tomales Bay watershed, including the Bolinas Ridge, is known for slope instability, thin soils, and high runoff rates. Similarly, the deeper soils on the granite-dominated Inverness Ridge can also be unstable, often leading to massive landslides during large storms that create catastrophic debris and sediment flows. As noted earlier, the Seismic Hazard Zone mapping has not been completed for Marin County (California Geological Survey 2004). However, the USGS (1997) has created a summary distribution map of slides and landflows within the San Francisco Bay region based on historic occurrences of landslides and landflows.

The Project Area itself is mapped as "flatland" and therefore not prone to landslide (USGS 1997). More than 70 percent of the eastern portion of the Tomales Bay watershed, however, is mapped as "Mostly Landslide," with the intervening areas mapped as "Few Landslides" (USGS 1997). The western portion of the watershed -- specifically the eastern portion of the Inverness Ridge draining to Tomales Bay -- is mapped largely as "Few Landslides," with a few pockets or areas representing less than 5 percent of the area characterized as "Mostly Landslide" (USGS 1997). However, anecdotal information from Inverness Ridge residents and local agencies responsible for culvert maintenance suggest that at least the portion of the Ridge adjacent to the Project Area erodes easily, with moderate amounts of sedimentation occurring in most average rainfall years and excessive amounts occurring during wet years.


Liquefaction Susceptibility
Giacomini Wetland Restoration Project
Liquefaction Susceptibility
Very High
High
Moderate
Low
Very Low
Faults
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.5
1
1.5
2 Miles
Figure 24
Source: The liquefaction susceptibility data was produced by the USGS. Fault traces are a product of the California Department of Conservation - Division of Mines and Geology.

Geologic Resources and Wetland Functionality

Perhaps, the most critical role that geology plays with regards to wetlands is formation and maintenance. Nowhere is this more evident than in Tomales Bay, which owes it very existence to the San Andreas Fault. However, geology can also influence wetland attributes such as functionality in a number of ways. For example, moderately abundant groundwater in this region provides water sources for municipal and private water supply and recharges surface water in creeks and other water bodies during the summer, which improves habitat quality for wildlife. The headwaters for many of the small drainages on the Inverness Ridge are seeps and springs, in addition to surface run-off, and seeps and springs that emerge at the base of hills serve to increase wetland diversity through increasing hydrologic complexity. From a formation perspective, faults act somewhat as an equalizing agent, with earthquake-induced subsidence counteracting to some degree the inherent tendency of tidal wetlands to evolve toward upland conditions over time due to sediment deposition on marshplains.

Soil Resources

While functions performed by wetlands are considered "hydrologic" or "biological," soils are integral components to almost all of these ecosystem services. Soils bind and transform nutrients and contaminants within floodwaters, which is critical for wetlands' ability to improve water quality. Plants, obviously, need soil to grow, and plants are important to both floodwater retention and water quality improvement through dissipating flood flow energy and allowing sediment, nutrients, and contaminants to drop out of the waters onto the floodplain. Much of the carbon that is exported to source waters such as bays and estuaries does not come directly from plants, but from plant and animal matter that is broken down in the soil into forms of organic matter that can be better assimilated by estuarine and marine organisms. While resident and non-resident wildlife use plants for foraging, protection, nesting, and resting, soil itself is an important wildlife habitat. Benthic and benthic stages of invertebrates burrow in mudflats, while species such as the northwestern pond turtle (*Clemmys marmorata marmorata*) aestivate in dry, sandy upland soils. Without soils – and, more importantly, a functioning soil environment – most wetlands would not be able to perform some of their vital functions.

Soils bind and transform nutrients and contaminants within floodwaters, which is critical for wetlands' ability to improve water quality

Soil Resources within the Project Area

Soil types mapped within the Giacomini Ranch and Olema Marsh are consistent with this area's unique geologic history. The Marin County Soils Survey provides generalized baseline information on soils within the project area (U.S. Soil Conservation Service (USSCS) 1985). Soils are classified into broad associations comprised of one or two major soil types, from which the name of the association is taken, and several minor soil types.

The northern 60 percent of the Giacomini Ranch and most of the Olema Marsh are comprised of Novato Clay (USSCS 1985; Figure 25). Novato Clay is described as "very deep, very poorly drained soil…in saltwater marshes ...formed in alluvium derived from various kinds of rock" (USSCS 1985). The historic coastal salt marsh in the southeastern corner of the Giacomini Ranch and the portion of Lagunitas Creek along Levee Road is mapped as Blucher Cole complex (USSCS 1985; Figure 25). The Blucher-Cole complex is also formed in alluvium from various kinds of rock, although this mapping unit is typically found in basins and on alluvial fans. Both components of this mapping unit are characterized as very deep soils that are somewhat poorly drained with seasonally high water tables and occasional periods of flooding (USSCS 1985). The southernmost portion of Olema Marsh, as well as the portion of Bear Valley Creek flowing into the Marsh,

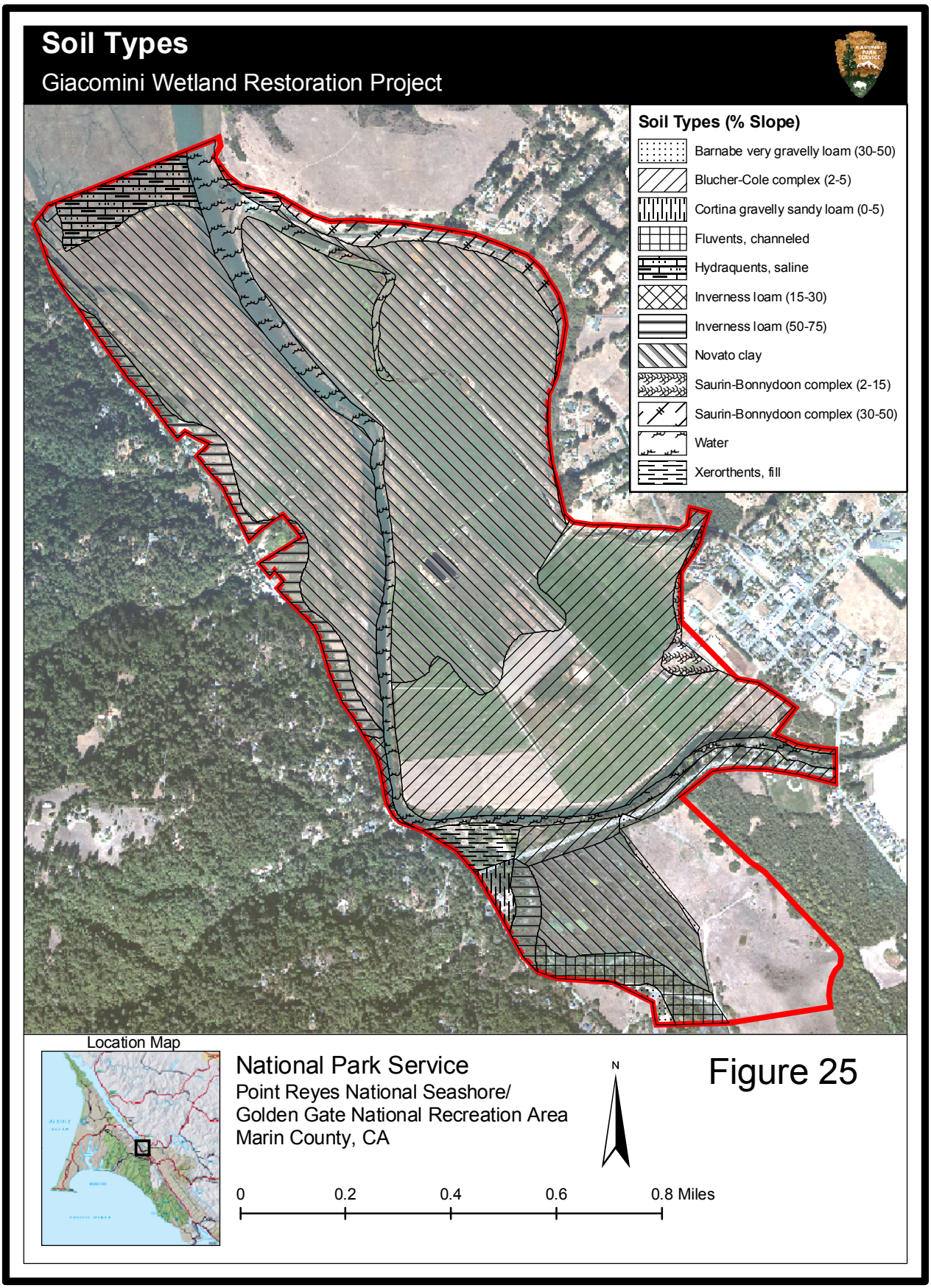

Soil Types
Giacomini Wetland Restoration Project
Soil Types (% Slope)
Barnabe very gravelly loam (30-50)
Blucher-Cole complex (2-5)
Cortina gravelly sandy loam (0-5)
Fluvents, channeled
Hydraquents, saline
Inverness loam (15-30)
Inverness loam (50-75)
Novato clay
Saurin-Bonnydoon complex (2-15)
Saurin-Bonnydoon complex (30-50)
Water
Xerorthents, fill
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.2
0.4
0.6
0.8 Miles

Figure 25

consists of fluvents, channeled, a hydric soil complex commonly formed in floodplains (USSCS 1985; Figure 25).

Soil borings conducted as part of the proposed project indicate, however, that soil patterns within the Giacomini Ranch and Olema Marsh are much more complex than the soil map would suggest. The historic salt marsh areas in the southern and eastern portions of the East Pasture typically consist of intermixed estuarine clays and peats overlain with a thin (~0.3 –0.5 m) loam or clayey loam layer (KHE 2006a). The very southern portion of the East Pasture has a very thick (2.5 m) accumulation of fluvially derived, interbedded silt and sand (KHE 2006a).

Conversely, sediment in many of the historic subtidal areas in the East Pasture that are directly adjacent to historic and current Lagunitas Creek channels are comprised of loam or silty loam overlain by interbedded silt, clay, and sand (KHE 2006a). Based on an understanding of surrounding geologic materials and the mode of their deposition, the shallow stratigraphy underlying the site includes depositional facies of alluvium (fluvial and alluvial fan deposits) bordering, overlying and/or interfingering with a variety of estuarine (marsh plain) deposits (KHE 2006a). The youngest deposits encountered consist of alluvial silts and fine-grained sands that blanket much of the southwest corner of the East Pasture. These sediments were deposited by floodwaters entering the East Pasture through the low spot in the Lagunitas Creek levee located between White House Pool and the fall summer dam. These sediments were deposited since reclamation of the site in the mid-1940s and overlie preexisting estuarine clays and peats representative of an intertidal high-marsh complex. Estuarine clays and peat deposits underlie the majority of the East Pasture and are capped in other locations by fill material and possibly alluvial fan materials at the historic mouth of Tomasini Creek. Unlike most estuarine deposits, which are high in organic matter, these soils had very low organic content, which, again, may be the reason that this area has not subsided as a result of diking (KHE 2006a).

In the West Pasture, a thin veneer of silty loam rests on a thick sequence of extremely permeable coarse-grained sands and gravels (KHE 2006a). The coarse-grained material probably marks the historic alignment of Lagunitas Creek or reflects near-channel accumulation of bedload and suspended sediment deposited during storm events (KHE 2006a). The texture and depositional relationship of the bulk of these deposits reflect a fluvial- or creek- dominated system displaying course-grained channel bed and bar deposits, fine-grained (silt and clay) overbank or floodplain deposits, and terrestrial organic matter representative of the freshwater marshes on the perimeter of the West Pasture. The northernmost portion of the West Pasture displays estuarine, organic-rich clay and peat, materials reflecting the current tidal and estuarine influence that now dominates this area. Although no soil borings were completed in the higher-elevation alluvial fans on the western perimeter of the West Pasture, site topography and observations of surface materials indicate well developed alluvial fans comprised of angular, coarse-grained sand to fine-grained granitic gravel emanating from the mouths of creeks draining the Inverness Ridge and overtopping and interfingering with fluvial and estuarine deposits (KHE 2006a).

Recent borings in lower Bear Valley Creek show an entirely different soil substrate in this area, with the substrate dominated by very thick beds (8-10 feet) of peat with a thin stratum of fine-grained clays on the surface (KHE 2006a). Thick deposits of shallow peat were also encountered by the County of Marin at the northwest corner of Olema Marsh while completing sediment removal excavations in the Levee Road drainage ditch feeding the western culvert outfall from the marsh (Liz Lewis, County of Marin, *pers. comm*.). Thus, it is inferred that these same shallow peat deposits dominate beneath the intervening Olema Marsh area (KHE 2006a). The historically marshy nature of this low gradient portion of the creek, combined with sustained water ponding in more recent times from damming of the marsh by levees, culverts, and gravel sills, has dramatically reduced breakdown of organic matter. Some creek-borne sand, clay and silt flood plain deposits were encountered with thin interbedded layers of terrestrial vegetation in the most upstream soil boring locations (KHE 2006a).

In summary, shallow soil stratigraphy reflects very well the hydrologic environments depicted in 1862 National Geodetic Survey map, which shows the historic alignment of Lagunitas Creek being through what is now the West Pasture, while the East Pasture, Olema Marsh, and lower Bear Valley Creek appear as estuarine tidal marsh.

Soil Resource Issues - Prime and Unique Farmland Soils

Regulatory and Policy Setting

The federal Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance, which is characterized primarily using soil types, as well as management regimes and other factors. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. California's Farmland Monitoring and Mapping Program was established in 1982 to assess the location, quality, and quantity of agricultural lands and conversion of these lands over time. FMMP is a nonregulatory program and provides an analysis of agricultural land use and land use changes throughout California every two years. Under Public Resources Code Section 21060.1 of CEQA, the FMMP is used to define agricultural land for the purposes of assessing CEQA environmental impacts to agricultural lands. A more detailed description of land use policies related to agriculture can be found under the Land Use and Planning section. Because the Prime and Unique Farmland Soils designation is still largely a soil-related characterization, the areal extent of Prime and Unique Farmland Soils is discussed under Soil Resources.

Prime and Unique Farmland Soil Resources within the Project Area

The most recent version (2004) of the Important Farmland map of Marin County shows the Giacomini Ranch and Olema Marsh as having several important farmland soil types (California Department of Conservation 2004). The definitions for Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Urban Built-up Land were developed by the U.S. Department of Agriculture (USDA) – Soil Conservation Service (SCS) as part of its nationwide Land Inventory and Monitoring (LIM) system. These LIM definitions have been modified for use in California by the California Department of Conservation, which oversees the Farmland Mapping and Monitoring Project (FMMP). The most significant modification is that Prime Farmland and Farmland of Statewide Importance soil types must be irrigated to qualify as important farmland. Farmland of Local Importance is identified by local advisory committees and varies from county to county, as intended by the LIM. Mapping of Grazing Land as part of an Important Farmland Map is unique to California. The California Department of Conservation has established a minimum mapping unit of 10 acres unless otherwise specified, with units of land smaller than 10 acres incorporated into surrounding map classifications.

Within the Project Area, the southeastern 133.2 acres of the Giacomini Ranch East Pasture was currently mapped as Farmland of Statewide Importance (California Department of Conservation 2004; Figure 26). The entire Giacomini Ranch West Pasture, the northernmost and easternmost portion of the East Pasture, the very westernmost portion of White House Pool County Park, and Olema Marsh are mapped as Grazing Land, totaling 293.2 acres (California Department of Conservation 2004). The remainder (136.4 acres) of the East Pasture and the White House Pool County Park are mapped as Farmland of Local Importance (California Department of Conservation 2004; Figure 26).

Farmland of Statewide Importance is land other than Prime Farmland which has a good combination of physical and chemical characteristics for the production of crops (California Department of Conservation 2006). It must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Farmland of Statewide Importance must meet all the following criteria: water, soil temperature, acidity-alkalinity, water table, soil sodium content, flooding, erodability, and rock content. Soils in the southeastern portion of the Giacomini Ranch qualified as Farmland of Statewide Importance soils, because the soil type, Blucher-Cole complex, 2 to 5 percent slopes, is one of several designated Farmland of Statewide Importance soil types.

Also, this area is currently irrigated for pasture purposes, which qualifies as "crops" for Prime Farmland and Farmland of Statewide and Local Importance designations, but not the Unique Farmland designation (M. Penberth, California Department of Conservation, *pers. comm*.). Important Farmland maps depict the Project Area as accounting for a moderately high percentage of the Farmland of Statewide Importance soils mapped in Marin County (~30 percent). However, this number is somewhat misleading as Giacomini Ranch only

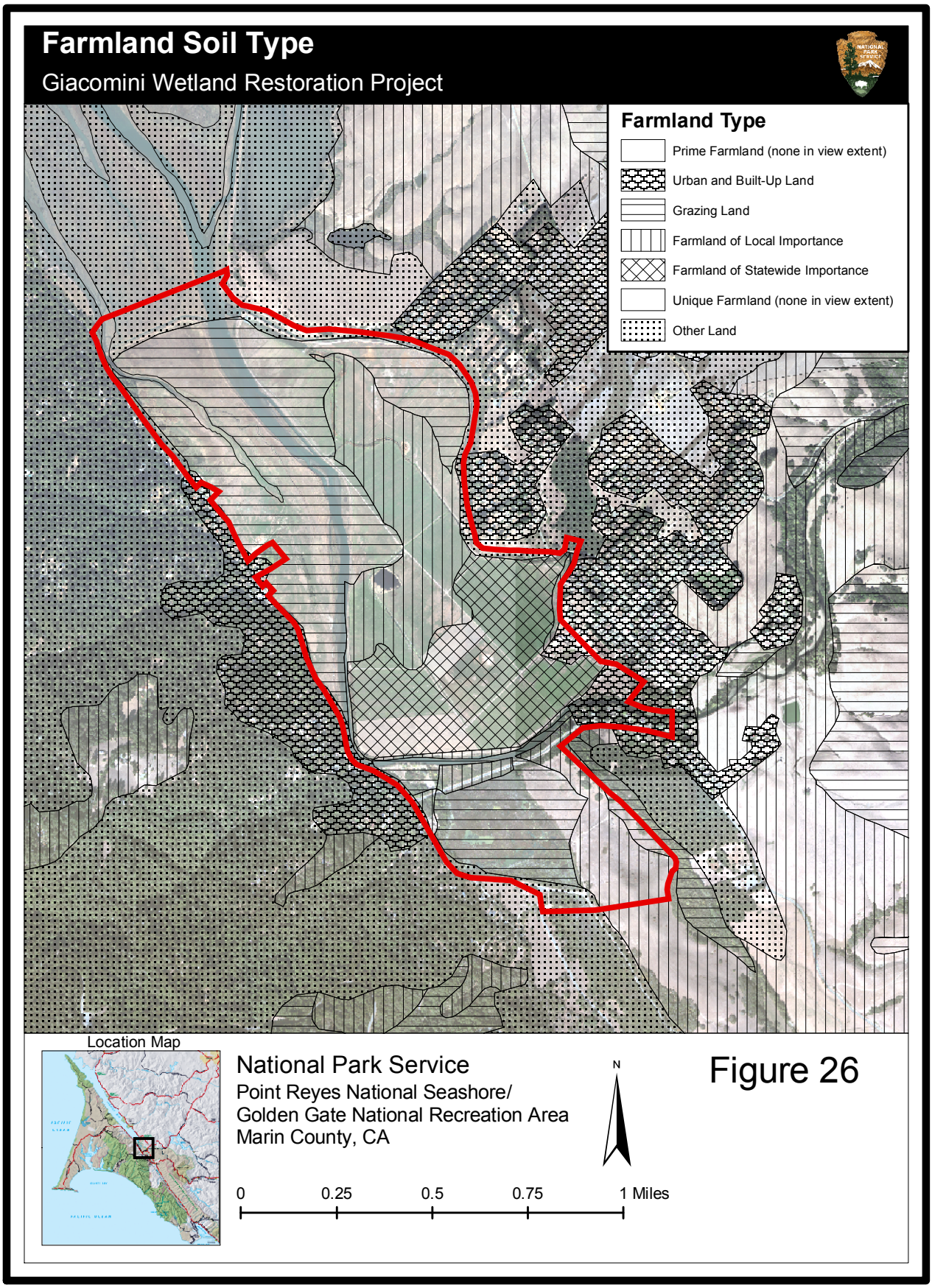

Farmland Soil Type
Giacomini Wetland Restoration Project
Farmland Type
Prime Farmland (none in view extent)
Urban and Built-Up Land
Grazing Land
Farmland of Local Importance
Farmland of Statewide Importance
Unique Farmland (none in view extent)
Other Land
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 26

represents 2 percent of the total acreage of Blucher-Cole complex soils mapped in Marin County. A large percentage of the other Blucher-Cole complex soils appear to be mapped as Farmland of Local Importance Soils or Grazing Land probably because, while they are grazed such as East Pasture, they are not irrigated. Most Farmland of Statewide Importance soils are probably irrigated for row crop or silage, rather than pasture, purposes.

Farmland of Local Importance is either currently producing crops, has the capability of production, or is used for the production of confined livestock (California Department of Conservation 2006). Farmland of Local Importance is land other than Prime Farmland, Farmland of Statewide Importance or Unique Farmland. This land may be important to the local economy due to its productivity or value. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Farmland of Local Importance is initially identified by a local advisory committee (LAC) convened in each county by FMMP in cooperation with the USDA-SCS and the county board of supervisors.

In Marin County, Farmland of Local Importance is defined as land that is not irrigated, but cultivated or has the potential for cultivation (California Department of Conservation 2006). In the Project Area, Farmland of Local Importance strongly overlaps with areas mapped as Novato Clay, although Local Importance soils are not necessarily linked to a particular soil type. Farmland of Local Importance has been mapped in the northern portions of the East and West Pastures, Olema Marsh, and portions of White House Pool County Park. In 2000, almost all of the areas with Novato Clay soils were designated as Farmland of Local Importance, however, some of these areas in the East and West Pasture have been reclassified in the 2004 map as Grazing Land, probably because of the poor likelihood for crop production given the persistent ponding during winter and spring and high residual soil salinities. This designation, however, has been retained for Olema Marsh and portions of White House Pool park, neither of which has been farmed in recent decades or currently has any realistic potential for farming. Farmland of Local Importance in the Project Area represents less than 0.2 percent of this mapped type in Marin County.

Grazing Land is defined in Government Code §65570(b)(3) as: "...land on which the existing vegetation, whether grown naturally or through management, is suitable for grazing or browsing of livestock" (California Department of Conservation 2006). The minimum mapping unit for Grazing Land is 40 acres. Grazing Land does not include land that is heavily brushed, timbered, excessively steep or rocky lands which restrict the access and movement of livestock. The FMMP convenes a grazing land advisory committee in each project county to help identify grazing lands. The committees consist of members of the local livestock ranching community, livestock ranching organizations, and the U. C. Cooperative Extension livestock advisor. The FMMP works with the president of the local Cattlemen's Association and the U.C. Cooperative Extension livestock advisor in selecting members of these committees. As noted earlier, Grazing Land is a new designation within the Project Area, with most of these lands being Farmland of Statewide or Local Importance that were reclassified. Grazing Land in the Project Area represents less than 0.3 percent of this farmland type in Marin County.

As discussed under Land Use, both the FPPA and CEQA require that projects that might affect prime, unique, and important farmland soil types complete a Land Evaluation and Site Assessment (LESA). LESA establishes a farmland conversion impact rating score that can be used as an indicator to determine the magnitude of adverse impacts on farmland. Results of the LESA are discussed under Land Use and Planning subsection in Chapter 4.

Soil Resource Issues - Sediment Quality and Contamination

One of the most valuable functions that wetlands can contribute to improving the health of a watershed is filtration and/or transformation of nutrients, sediment and contaminants in associated surface and ground water sources. Soluble and sediment-bound nutrients, sediment, bacteria, and contaminants, such as metals, pesticides, and polyalkylated hydrocarbons, can enter wetlands through tidal or freshwater flow. Once they have entered a wetland, sediments and nutrients are deposited onto the floodplain, with nutrients often transformed within the soil or uptaken by plants. Contaminants are often precipitated and bound through sediment reduction processes into insoluble iron or sulfide compounds, dissolved organic compounds, or humic acids (Gambrell 1994; Horne 2000). Natural wetlands are believed to remove as much as 50 percent of ammonium and Total Nitrogen, 20 percent of Total Phosphates, and 30 percent of metals from source waters (Kadlec and Knight 1996).

With the increasing number of wetland restoration projects in San Francisco Bay and the central California coast in the past decade, concerns have been raised among biologists and hydrologists that these stable "sinks" for contaminants could potentially become "sources" of contamination to the environment (Davis et al. 2003). This remobilization could potentially reduce productivity and filtering functions of wetlands, create water quality problems, or reintroduce toxins that may be uptaken by wildlife (Davis et al. 2003).

Wetland restoration can affect reintroduction of nutrients, sediment, and contaminants to the environment in several ways. First, removal of levees in diked marshes could cause sediment erosion through tidal overwash or development of new channels, thereby potentially resuspending sediment and nutrient- and contaminant-laden sediments. Secondly, changes in the hydrologic regime of areas undergoing restoration also can increase the potential for remobilization of nutrients and contaminants. Many contaminants become more soluble under conditions of low pH that sometimes result when reduced sediments become oxidized, such as when tidal action is introduced to diked areas that were consistently inundated or impounded previously (DeLaune and Smith 1985; Soukup and Portnoy 1986; Gambrell et al. 1991; Peverly and Kopka 1991; Satawathananont et al. 1991; Gambrell 1994; Anisfeld and Benoit 1997). This oxidation can cause a flush of nutrients within overlying waters from breakdown of undecomposed organic matter within formerly anoxic soils (Soukup and Portnoy 1986, Anisfeld and Benoit 1997).

The Tomales Bay watershed is generally considered pristine relative to other large watersheds along the California coast. However, as will be discussed in greater detail under Hydrologic Resources – Water Quality, it is not immune to the negative effects of anthropogenic influences, such as logging, agriculture, leaking septic systems, oil spills, and mercury mining. The absence of large scale industry and the relatively low density of people and cars within the watershed have limited the potential for direct discharge of contaminants such as polychlorinated biphenyls (PCBs) and hydrocarbons, yet there is still the possibility of indirect contamination to Tomales Bay via atmospheric deposition of PCBs and hydrocarbons originating from outside the watershed (Parsons and Allen 2004a). The prevalence of dairy and beef cattle ranching, as well as other forms of agriculture, in this watershed increases the potential for the presence of herbicides and pesticides and other types of pollutants such as bacteria and excessive nutrients relative to more contaminants generally associated with more urban environments such as PCBs (Parsons and Allen 2004a).

Because restoration activities are anticipated to cause some degree of soil disturbance and relocation that might cause any potential nutrients or contaminants present to be released, the Park Service conducted screening-level sediment contaminant and nutrient studies in the Giacomini Ranch and adjacent areas in 2003 and 2005 (Parsons and Allen 2004a, NPS, unpub. data). More information on nutrients and pathogen levels within Project Area waters can be found under the Water Resources – Water Quality discussion.

Regulatory and Policy Setting

From a regulatory perspective, the issue of sediment contamination is tightly linked to water quality. The San Francisco Regional Water Quality Control Board (RWQCB) has established narrative objectives for the amount of suspended sediment in waters, and suspended sediment often is bound to nutrients, pathogens, and contaminants such as mercury. Indeed, the tight link between mercury and sediment transport, deposition, and resuspension has led the RWQCB to be the lead agency evaluating the effect of mercury from the Gambonini Mine on Walker Creek and Tomales Bay under the Clean Water Act, as well as under other state legislation. The Clean Water Act is discussed under Water Resources – Water Quality. The Basin Plan (Regional Water Quality Control Board (RWQCB) 1995a)notes that the suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. In addition, "controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life" (RWQCB 1995a).

The explosion in chemical manufacturing and marketing during the mid 20th century dramatically increased the threat to public health from contamination. During the last 50 years, hundreds of thousands of chemicals have been developed, and the production of synthetic chemicals jumped from 1.3 billion lbs. in 1940 to 320 billion lbs. in 1980 (Orford 1991). Serious public health issues associated with dumping or storage of very hazardous chemicals such as the infamous Love Canal prompted a series of federal pieces of legislation designed to regulate transport and disposal of hazardous waste and require clean-up of toxic areas through the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq. --1976) and Comprehensive Environmental Response, Compensation, and Liability Act (42 (U.S.C. 9601 et seq. -- 1980), also known as Superfund.

Nutrients

Relative to some other natural vegetation communities, most tidal marshes would be considered nutrient-poor, at least in terms of nitrogen (Mitsch and Gosselink 1993). While the pastures have remained largely wetland in nature despite diking, nutrient concentrations appear to exceed those of natural, undiked marshes, although spot sampling was only conducted once in August 2005 (NPS, unpub. data). Nitrate levels in some of the East Pasture surface soils ranged between 6 – 29 mg/L, while phosphorus ranged between 7-11 mg/L (n=3; NPS, unpub. data). In comparison, nitrate in the undiked marsh north of Giacomini Ranch ranged between 3-6 mg/L, and phosphorous ranged between 5-8 mg/L (n=2; NPS, unpub. data). Interestingly, nitrates in the West Pasture freshwater marsh, which is only infrequently grazed by cattle, ranged as high as from 29-81 mg/L, while phosphorous concentrations were very low, ranging from 1-3 mg/L (n=2, NPS, unpub. data). Nitrate data for the freshwater marsh may reflect more nitrogen potential of the soil: drying of soils for analysis may have increased organic matter breakdown and nitrification of ammonia to nitrates, which is normally precluded in soils with prolonged waterlogging and anoxia. Not surprisingly, the highest nitrate and phosphorous concentrations were recorded in the East Pasture field used for manure disposal, with concentrations in surface soils of nitrates reaching 134 mg/L and phosphorous, 489 mg/L (NPS, unpub. data). In the manure field, nitrate concentrations dropped by half 6 inches below the soil surface, but phosphorous concentrations remained more variable (NPS, unpub. data).

Metals and Other Contaminants

Many watersheds along the central California coast are naturally high in certain metals such as mercury and nickel due to the presence of mineral deposits and ultramafic rocks. Mercury used to extract gold during the gold rush period in the Sierra Nevada Mountains came from the coastal ranges in California. Later, mercury was mined for other purposes. Between 1964 and 1970, the Gambonini family operated a cinnabar ore or mercury sulfide mine in the Walker Creek watershed, a sub-watershed of Tomales Bay (Whyte and Kirchner 2000; TBWC 2002). Waste from this mine was stored in a tailings pond that breached during extreme storm events in 1982, sending much of this mercury-laden sediment downstream to Tomales Bay. As much as 180 lbs of mercury moved downstream over a period of two months (D. Whyte, RWQCB, pers. comm. in Parsons and Allen 2004a). Whyte and Ganguli (2000) conducted sediment sampling throughout Tomales Bay in the 1990s and determined that mercury concentrations were highest at the mouth of Walker Creek, averaging 10-12 ppm, and decreased in a bell-curve fashion with distance from the mouth. Through sulfur reduction processes in the sediment, this mercury can become methylated and made available to benthic organisms such as oysters and ghost shrimp. These invertebrates, in turn, are consumed by organisms of higher trophic order such as fish and birds.

Studies in Tomales Bay have shown that mercury concentrations in the tissues of sharks, halibut, perch and bat rays from Tomales Bay are slightly higher than those from San Francisco Bay (D. Whyte, RWQCB, pers. comm. in Parsons and Allen 2004a). In addition, mercury levels in liver tissue of ducks from Tomales Bay were two to three times greater than those of ducks from historically contaminated Suisun Bay. Whyte noted that most of the current effects of mercury contamination in Tomales Bay result from resuspension of mercury-laden sediments that were deposited during or slightly after the 1982 storm events. Sediment resuspension of this nature occurs because of scouring and channel migration related to tidal flow (D. Whyte, RWQCB, pers. comm. in Parsons and Allen 2004a).

Results from a study conducted by Long et al. (1990) support the growing awareness that Tomales Bay is not as pristine as previously assumed. The study subjected various benthic invertebrates to survival tests in sediment samples collected from sites in Tomales Bay and San Francisco Bay. Chemical analyses of the Tomales Bay sediment suggested that it was not contaminated, yet the Tomales Bay sediment bioassay samples were categorized with samples from Oakland Inner Harbor as among the most toxic to the test organisms. The same study found that benthos samples collected from Tomales Bay were dominated by relatively hardy polychaetes and molluscs and were nearly devoid of sensitive crustaceans. Based on these finding, the authors concluded that some unknown factor or factors had rendered Tomales Bay sediments "relatively inhospitable" to many benthic organisms.

On the Giacomini Ranch, ranching activities appear to have resulted in comparatively little contamination of soils (Parsons and Allen 2004a). Based on land use and land management practices, the potential for toxic contaminants within the ranch itself would seem to be restricted to decades of hunting with lead shot in

portions of the East Pasture and possible spraying of undesirable plants and pests with herbicides or pesticides (Parsons and Allen 2004a). However, the Project Area may be affected by outside sources of contaminants such as mercury from the Gambonini mine and pollutants from nearby landfills. Several RWQCB sampling events between 1999 and 2000 documented the presence of leachates, if not organic compounds and other types of contaminants, in surface waters of Tomasini Creek near Mesa Road one mile downstream from the now closed West Marin Landfill, which at one point took both hazardous and household wastes (D. Elias, Engineering Geologist, RWQCB, *pers. comm*.). Another dump may have once existed just south of the Giacomini Ranch adjacent to Lagunitas Creek and the Green Bridge that served the town of Point Reyes Station during the 1920s -1930s. While perhaps not used for dumping of higher volumes of toxic wastes as would be older landfills in urban and industrial areas, these landfills still represent sources of possible contamination to the Project Area, particularly these landfills were constructed and largely operated during a period of less stringent regulation regarding liners, distance to groundwater tables, etc.

In the Seashore's study (Parsons and Allen 2004a), the only contaminant that exceeded National Oceanic and Atmospheric Administration's (NOAA's) sediment quality guidelines was nickel, which exceeded NOAA's Effects Range-Median (ERM) at several of the 20 sampling locations. NOAA's ERM is national benchmark that correlates to the concentration at which adverse benthic impacts are found in approximately 50 percent of studies, while Effects-Range Low (ERL) represents a concentration at which adverse impacts were detected in 10 percent of the studies. Nickel and some other metals are naturally high in certain geologic formations, including the Franciscan Formation, which borders the Project Area to the east. Cadmium was also detected at concentrations exceeding the Ambient Sediment Concentration (ASC) standards for San Francisco Bay in Tomasini Creek near Mesa Road, but the level was still substantially lower than NOAA's ERL or ERM standards (Parsons and Allen 2004a).

The two analytes that perhaps were of most concern – methylated mercury and lead – due to watershed mercury contamination and long-term hunting in the Project Area occurred at concentrations well below both published standards and levels observed in San Francisco Bay subtidal and wetland areas (Parsons and Allen 2004a). Reporting limits for selenium and organics laboratory analytical methodologies used were high enough that they precluded comparisons with published standards (Parsons and Allen 2004a). The relatively rural, non-industrialized nature of this watershed suggests, however, the potential for selenium and organics contamination is relatively low, except for those contaminants that disperse through atmospheric deposition, as well as point source and non-point discharge from isolated features such as the West Marin Landfill (Parsons and Allen 2004a).

Soil Resources and Wetland Functionality

As described earlier, soils are integral components of many hydrologic and ecological functions, either directly or indirectly. These functions include water quality improvement, carbon export, and wildlife habitat use and support. The ability of soils to bind or retain contaminants and thereby improve water quality is strongly related to texture (e.g., percentage of clays, silts, sands, and other material), organic matter (e.g., decomposing plant matter), and oxygen. With the exception of deltas, most natural tidal and freshwater marshes have high amounts of fine sediments such as clay and organic matter that, because of their chemical properties, act to strongly bind contaminants. Materials such as sands and gravels are not only more porous or contain more air space between soil particles, but do not possess the same chemical properties that enable nutrients, metals, pathogens, and other contaminants to bind strongly to them. Another important parameter of wetland soils is the lack of oxygen. Sustained inundation or saturation of soils by water causes the soil environment to become reduced or anaerobic, which initiates a complex biogeochemical that helps to lock contaminants into the soils. Once bound to soils, these contaminants are rarely released back into their environment, unless there are drastic changes in wetland conditions such as oxidation of soils due to dewatering. The natural filtering mechanisms of wetland soils have encouraged many municipalities to turn to treatment wetlands to treat or, polish wastewater.

Because of its unique geologic history, soils within the Giacomini Ranch contain less clay and peat material than many other historic marshes. In the East Pasture, very fine, estuarine-derived clays interbedded with peats – very fine decomposed organic matter -- were typically overlain by anywhere from 1.5- to 5 feet of clayey to sandy alluvial material derived from fluvial or creek sources (KHE 2006a). Organic content of the estuarine clays appears relatively low based on laboratory analyses, ranging from 5- to 18- percent (KHE 2006a) compared to 20- to 40 percent in many natural marshes. Soils in the West Pasture consist of an

interbedded mixture of layers of gravel, sand, silt, and clay, with the clays again varying in the amount of organic matter content (KHE 2006a). Conversely, Olema Marsh is dominated by peat and fine-grained clays, with substantially lower amounts of fluvial-derived sand, clay, and silt particles (KHE 2006a).

Most of the overlying soils in the Giacomini Ranch undoubtedly date to the massive influx of sedimentation from the upstream watershed that started in the 1860s and still continues to some extent to this day, although the levees have substantially reduced the amount of deposition on the historic floodplains of Lagunitas and Tomasini Creeks. In addition, alluvial material has deposited at the mouths of many of the small creeks and drainages within the Project Area. To a lesser degree, agricultural management has resulted in selective filling of pastures, particularly in the south end of the East Pasture. In contrast, land management in the Bear Valley Creek watershed appears to have somehow precluded downstream deposition of alluvium – which is also prevalent in this system -- into Olema Marsh, preserving a vegetation-controlled depositional environment. The fine-grained clays occurring with the abundant peat were probably deposited when conditions were estuarine (KHE 2006a)

Air Resources

Air Resource Issues - Air Quality

Regulatory and Policy Setting

Under NPS-77 (Natural Resource Management Guidelines), the Park Service is directed to "seek to perpetuate the best possible air quality in parks because of its critical importance to visitor enjoyment, human health, scenic vistas, and the preservation of natural systems and cultural resources." Parks are urged to "assume an aggressive role in promoting and pursuing measures to safeguard [air quality related values] from the adverse impacts of air pollution." As a federal agency, the Park Service must comply with the Clean Air Act of 1970 (CAA), which underwent several major revisions in 1977 and 1990. Under the CAA, the Seashore is classified as a mandatory Class I area. Title I of the CAA amendments of 1990 defines Class I areas as including all national parks greater than 6,000 acres that were in existence when the CAA was amended in 1977 and identifies these areas as receiving the most stringent protection from air pollution damage. The Park Service is responsible for the protection of parks from ambient air quality impacts, including air quality-related values (AQRVs) such as visibility and the protection of plants, animals, soils, water quality, cultural and historic structures from the effects of contaminants. The northern lands of the GGNRA, including the Project Area, are a federal Class II area.

The CAA charges the Environmental Protection Agency (EPA) with identifying national ambient air quality standards to protect public health and welfare. Standards have been set for seven pollutants: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns (PM10), very fine particulate matter less than 2.5 microns in diameter (PM2.5), and lead (Pb). A description of these pollutants can be found below and in Table 5. Ozone is produced by the combination of pollutants from many sources, including smokestacks, cars, paints and solvents and is one of the chemicals responsible for formation of smog. Carbon monoxide is a colorless, odorless, poisonous gas that is produced by incomplete burning of carbon-based fuels, including gasoline, oil and wood. Nitrogen dioxide, produced by combustion sources such as cars, power plants, and industrial engines, is a respiratory irritant and a precursor to ozone and, therefore, smog formation. Sulfur dioxide is a gas produced by burning coal, most notably in power plants, and plays an important role in the production of acid rain. Reactive Organic Gas (ROG), a reactive chemical gas composed of hydrocarbons, may contribute to the formation of smog. Particulates are produced by soots, dusts, and smokes and are also a respiratory irritant. If a standard for a particular pollutant is exceeded more than three times in three years in an air basin, it is considered a non-attainment area and is then subject to more stringent planning and pollution control requirements. The San Francisco Bay Area Air Basin, under which the Project Area falls, is a federal non-attainment area for ozone (Table 6).

The federal government has ceded responsibility and authority to establish air quality standards and regulations to states. State air quality agencies are required to demonstrate conformity of actions to national air quality standards or, in the case of federal agencies, applicable SIPs developed by state air quality agencies. The Bay Area Air Quality Management District (BAAQMD) is the air quality management district for the Project Area and has primary responsibility for control of air pollution in the Bay Area Air Basin. BAAQMD

has prepared SIPs to address nonattainment and maintenance issues related to the national ozone and carbon monoxide standards and is in the process of revising the ozone SIP in collaboration with the Association of Bay Area Governments and MTC. The USEPA had been expected to issue a final action on the SIP revision, the *San Francisco Bay Area Transportation Air Quality Conformity Protocol*, in spring 2007, however, on December 22, 2006, the U.S. Court of Appeals for the District of Columbia Circuit vacated USEPA's Phase new 8-hour ozone implementation rule. The USEPA is currently analyzing impacts of this decision on its regulation of ozone.

Prior to even initial federal efforts to regulate air quality, the state of California was already establishing air quality standards and necessary controls for mobile vehicle emissions through the state Department of Public Health in the late 1950s. In 1988, the California Clean Air Act was passed. California differs from every other state in that it has retained the authority to develop its own vehicle emissions standards if those standards are at least as stringent as the federal standards under Section 209(b) of the CAA. The California Air Resources Board (CARB) sets air quality standards for the state targeted at reducing emissions in each of the 35 local air districts, one of which is the Bay Area Air Basin. To protect public health and welfare, the California Air Resources Board (CARB) has set stricter ambient air quality standards than national standards (Table 6). Under the 1988 California Clean Air Act, air basins were designated as attainment, non-attainment, or unclassified for the state standards. The Bay Area Air Basin is classified as a California non-attainment area for ozone and particulate matter (Table 6). Both CARB and the USEPA have general oversight responsibilities for the purpose of making sure local rules and regulations and stationary source permits issued are consistent towards attainment and maintenance of the California and National Ambient Air Quality Standards (AAQS).

TABLE 5. OVERVIEW OF POLLUTANTS OF GREATEST CONCERN IN THE SFBAAB

Pollutant	Sources	Health and Other Concerns
Ozone	Formed by a photochemical reaction in the atmosphere; ozone precursors, including reactive organic gases and oxides of nitrogen (NOx), react in the atmosphere in the presence of sunlight to form ozone. Ozone precursors are emitted by mobile sources such as vehicles, and by stationary combustion equipment.	A severe eye, nose, and throat irritant; increases susceptibility to respiratory infections. An oxidant; can cause substantial damage to synthetic rubber, textiles, and other materials. Produces leaf discoloration and cell damage in plants.
PM10	Results from many kinds of dust- and fume-producing activities, such as demolition, construction, and vehicular traffic; entrained road dust from motor vehicles accounts for approximately two-thirds of the regional PM10 inventory in the project area.	Health concerns focus on particles small enough to be drawn into the lungs when inhaled (PM10). Can increase the risk of chronic respiratory disease with extended exposure.
CO	Motor vehicles are the primary source of CO emissions in most areas. In the urbanized portions of the San Francisco Bay Area, high CO levels primarily develop during the winter near congested intersections, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. In addition, motor vehicles exhibit increased CO emission rates at low air temperatures.	Combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to death.

The USEPA has developed criteria and procedures for determining the conformity of federal actions to the applicable SIPs. The Transportation Conformity rule (40 CFR parts 51 and 93) and the General Conformity rule (40 CFR parts 51 and 93) apply to nonattainment areas and maintenance areas covered by an approved attainment or maintenance plan. Under either conformity rule, conformance with an applicable SIP is demonstrated by showing that expected emissions are consistent with the emissions budget for the area or air quality basin. Federal actions cannot cause or contribute to new violations, increase the frequency or severity of any existing violation, interfere with timely attainment or maintenance of a standard, delay emission reduction milestones, or contradict the State Implementation Plan. Certain types of federal projects, including trail construction, are considered to have the potential for only *de minimis* impacts and are not required to demonstrate conformance. Therefore, all Park Service areas are required to comply with state laws on these matters regardless of the type of legal jurisdiction that applies to other activities within the Park Service unit.

TABLE 6. AMBIENT AIR QUALITY STANDARDS & BAY AREA ATTAINMENT STATUS

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone (O_3)	8 Hour	0.070 ppm (137µg/m)	U	0.08 ppm	N
	1 Hour	0.09 ppm (180 µg/m)	N		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m)	A	9 ppm (10 mg/m)	A
	1 Hour	20 ppm (23 mg/m)	A	35 ppm (40 mg/m)	A
Nitrogen Dioxide (NO_2)	Annual Average			0.053 ppm (100 µg/m)	A
	1 Hour	0.25 ppm (470 µg/m)	A		
Sulfur Dioxide (SO2)	Annual Average			0.03 ppm (80 µg/m)	A
	24 Hour	0.04 ppm (105 µg/m)	A	0.14 ppm (365 µg/m)	A
	1 Hour	0.25 ppm (655 µg/m)	A		
Particulate Matter (PM10)	Annual Arithmetic Mean	20 µg/m	N	50 µg/m	A
	24 Hour	50 µg/m	N	150 µg/m	U
Particulate Matter Fine (PM2.5)	Annual Arithmetic Mean	12 µg/m	N	15 µg/m	A
	24 Hour			65 µg/m	A
Sulfates	24 Hour	25 µg/m	A		
Lead (Pb)	Calendar Quarter			1.5 µg/m	A
	30 Day Average	1.5 µg/m	A		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m)	U		
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m)	No information available		
Visibility Reducing particles	8 Hour (1000 to 1800 PST)	(See note 3)	A		
A = Attainment N = Nonattainment U = Unclassified					
mg/m^3=milligrams per cubic meter		ppm=parts per million		µg/m^3=micrograms per cubic meter	

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM10, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM10 annual standard), some measurements may be excluded. Measurements may be excluded that would occur less than once per year on the average.
2. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM10 standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour PM2.5 standard is attained when the 3-year average of 98th percentiles is less than 65 µg/m^3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM10 is met if the 3-year average falls below the standard at every site. The annual PM2.5 standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.
3. Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

The County of Marin has also established policies regarding air quality in the Marin CWP (Marin County Community Development Agency 2005). The local general plan for the appropriate city or county must be consistent with the Clean Air Plan for this guideline to apply (BAAQMD 1999). The Marin CWP is considered consistent with the Clean Air Plan (Illingworth & Rodkin and Nichols Berman 2002).

Air Quality Resources within the Region

A cooperative program, the Interagency Monitoring of Protected Visual Environments (IMPROVE), between the EPA, federal land managers, and state air agencies, was formed to monitor visibility in Class I areas. Data published in a recent IMPROVE report shows that visibility at the Seashore improved during the period of 1996 to 1999 primarily due to a decrease in nitrate particulates, a major component of visibility-blocking material in coastal California. Particulate nitrate is formed from nitrogen oxide and hydrocarbon gases emitted into the atmosphere from fires, diesel engines, and other sources (Malm 2000). Monitoring by the Park Service found no ozone exceedances at the Seashore under either the California or federal standard. Park air resources are rated as having low exposure to ozone, sulfur, and nitrogen emissions and low potential for acidification of surface waters. A recent Park Service report states that "there are no significant air pollution effect concerns in this park [the Seashore] at the present time" (Sullivan et al. 2001).

Some of the greatest threats to air quality within the Seashore and the western portions of Marin County come from outside the region. In 2000, Marin County had a total population of 247,289 (U.S. Census Bureau 2000). As discussed earlier, most of Marin's population lives to the south and east of the Project Area along the county's main transportation corridor, Highway 101. Other populated areas -- including Petaluma in Sonoma County -- are located in a more easterly direction, inland from Point Reyes. Only a small, relatively scattered population lives in the vicinity of the Seashore. Air quality within the coastal portion of rural West Marin can be affected by problems outside the immediate vicinity of the Seashore. In general, the BAAQMD has been unable to attain the ozone (O3) and carbon monoxide (CO; pertinent to urbanized areas only) standards set by the AAQS for the Bay Area. These air quality problems have the potential to affect seemingly unpolluted coastal regions because of wind, air temperature, gradients, and local and regional topography.

Some of the greatest threats to air quality within the Seashore and the western portions of Marin County come from outside the region

The marine influence that moderates temperatures along the central California coast also affects wind direction and speed. Many areas of the Seashore, particularly along the Drakes Bay, the Lighthouse, and Point Reyes Headlands, are exceptionally windy. Wind speed along the west Marin Coast averages 8- to 10 mph (BAAQMD 2003). During the winter, the predominant regional surface winds flow from the north-northeast (Bell 1958). During spring and summer, stronger north-northwest winds dominate (Bell 1958). These northwesterly winds are primarily caused by the combination of high pressure offshore and the warmer air inland. These winds blow off the ocean and are slowed down, if not intercepted completely, by the complex terrain of the Bolinas Ridge (BAAQMD 2003). During the fall transition, warm easterly winds from the hot, dry inland areas often break through to the coast.

Bolinas Ridge provides a topographic barrier for air pollutants from San Francisco Bay, as since winds play a major role in dispersing pollutants far from respective sources. Air pollution in the region is moderated by strong, westerly winds most of the year. Other sources of pollutants are inversions. When cold air becomes trapped under warm air, the air masses cannot mix, and pollutants begin to accumulate. The frequent occurrence of temperature inversions over the Seashore could concentrate air pollution levels near the ground. Pollutants are more concentrated near the ground during colder weather or after sunset. In general, "the influence of the marine air keeps the pollution levels low" (BAAQMD 2003).

Sensitive receptors refer to land uses that are considered particularly sensitive to decreases in air quality. The designation typically refers to uses such as residences, schools, libraries, hospitals, and other similar facilities where there are large concentrations of children and young people; the elderly; and/or the chronically ill.

Because the Project Area is within a relatively rural community, there are not a large number of sensitive receptors located nearby. However, there are small schools, preschools, and a library in the town of Point Reyes Station. In addition, because the Project Area occurs in an area is widely used for recreation, wildlife viewing, agricultural production, and scientific research, and these uses are potentially vulnerable to air quality degradation.

The only air pollutant currently measured in the Point Reyes region is PM2.5 or small particulate aerosols that affect acid deposition and regional haze. Recent data (1999-2001) indicate a daily average concentration of 8.330 ug/m3 or less averaged over three years of data collection, which is well below the state and federal AAQSs of 12 and 15 ug/m3, respectively. As no other ambient air pollutant is measured in this region, air quality data were obtained from other nearby BAAQMD monitoring stations in San Rafael (Marin), Santa Rosa (Sonoma), and Vallejo (Napa). In summary, these stations, which are located in more heavily developed areas, met standards for carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), and federal, but not state, standards for ambient particulates smaller than 10 microns (BAAQMD 2003). Santa Rosa exceeded the state's maximum 24-hour average for ozone twice during the three-year period and California's one-hour ozone standard once (BAAQMD 2003b).

Air Resource Issues – Noise and Soundscapes

Background and Regulatory and Policy Setting

While noise often has a negative connotation, one of the intrinsic values of national parks remains the potential for hearing "natural" noises such as crashing waves, running streams, thunder, or singing birds. A combination of noises that is intrinsic to a natural landscape is often characterized as a soundscape. The ability to hear these natural noises in a soundscape is somewhat dependent on the absence of unwanted sound such as urban noise. Unwanted sound can be simply intrusive, destroying either a relaxing experience or the comfort of one's home, or harmful to people's health through hearing impairment or loss.

Unlike more urban parks, the Seashore and north district of GGNRA are located in a rural portion of western Marin County and must contend less with the intrusive influences of urbanization than the southern portions of GGNRA. Regardless of location, however, the Park Service is directed to preserve, to the greatest extent possible, the natural soundscapes of parks and to protect natural soundscapes from degradation due to noise, defined as "undesirable human-caused sound" (NPS 2001, Section 4.9). The natural soundscape is defined as the aggregate of all the natural sounds that occur in parks, absent human-caused sound, together with the physical capacity of transmitting natural sounds (NPS 2001, Section 4.9). The Park Service policy is a more stringent standard than set by the federal Noise Control Act of 1972 or most general plans produced by cities or counties.

The federal Noise Control Act required federal agencies to promote an environment free of the noise that can jeopardize public health or welfare. Sound can be characterized using two parameters: amplitude (loudness) and frequency (tone). The agency tasked with implementing the Noise Control Act, the EPA, established outdoor limits of 55 decibels (dB) and indoor limits of 45 dB averaged throughout a 24-hour period. Decibels refer to the amplitude or peak pressure of the sound wave and are interpreted by humans and wildlife as different degrees of sound loudness. For comparison purposes, an average office has mean noise levels of 60 dB, while close proximity to a jet engine has noise levels as high as 140 dB (Egan 1972; HUD 2004). The noise level of rustling leaves in a forest -- the sound that many visitors come to parks to experience – can be as low as 20 dB (Egan 1972 *in* HUD 2004). Laboratory measurements have correlated a 10 dB increase in amplitude with a perceived doubling of loudness and a 3 dB change in amplitude as the minimum audible difference perceptible to the average person (Federal Highway Administration 1982; EDAW Inc. 2001).

In 1994, the Marin County Noise Element mandated that residences, public spaces, and institutions not be subjected to noise levels above an average of 60 dB over a 24-hour period. Many planning agencies use a 24-hour average of noise intensity, with a 10 dB "penalty" added for nighttime noise (10:00 p.m. to 7:00 a.m.) to account for the greater intrusiveness of loud noises during this time of the day (California Code of Regulations 1988). Marin County is currently in the process of revamping the CWP with the last draft issued in 2005. The County has also developed noise criteria for significance thresholds in its Marin County Environmental Impact Review Guidelines (Marin County Community Development Agency 1994). These criteria generally characterize noise impacts as significant if the project would generate noise that conflicts with countywide or

state noise standards; 2) substantially increases noise levels in areas of sensitive receptors; or 3) is not compatible with baseline noise levels.

Noise and Soundscape Resources within the Project Area

Major noise producers in most areas include highway traffic, trains, planes, boats, and industry-related machinery within industrial zones. In rural areas such as west Marin, major producers of undesirable human-caused sound are limited to automobile and truck traffic, jet airplanes, individual businesses, agricultural ranch activities, and individual construction projects. In general, ambient noise levels remain lower in rural areas than in urban areas. In urban areas, ambient noise levels typically range from approximately 60 to 70 dBA, whereas, in rural areas, ambient noise levels range from 40 to 50 dBA. No ambient noise levels are available for the Seashore. However, Marin County assessed noise levels on State Route 1 south of Point Reyes Station in 1987 and 2001, and average ambient noise levels over a 24-hour period climbed from 62 to 65 decibels during those 14 years (Marin County Community Development Agency 2004)). Another ambient noise survey conducted as part of the Affordable Housing project in Point Reyes Station recorded 24-hour average ambient noise levels of 69 dBA at State Route 1 and a newly constructed street near Mesa Road, Williams Street, with maximum and minimum levels of 87 and 43 dBA, respectively. Average ambient noise levels of 66 dBA were measured at Mesa Road and Commodore Webster Drive, with maximum and minimum levels of 87 and 45 dBA, respectively (EDAW Inc. 2001). Traffic on local roads and State Route 1 constituted the dominant noise source during this 2000 survey, which was conducted in the late afternoon (EDAW Inc. 2001).

On its eastern boundary, the Project Area is located directly adjacent to Point Reyes Station, where automobile and truck traffic, agricultural ranch activities, and individual businesses in the town constitute most of the anthropogenic noise sources. On its western boundary, the Project Area is located next to Inverness Park, a small residential community with more limited ranch and business activity than Point Reyes Station. However, Sir Francis Drake Boulevard, the main road for visitors, residents, and park staff traveling to the interior of the Seashore, runs through Inverness Park, and this road generates more than 300,000 vehicle trips per year (NPS 2002). Most of the homes in Inverness Park and all of those in the town of Point Reyes Station proper are located above the Project Area either on Inverness Ridge slope or the top of the Point Reyes Mesa, respectively. There are approximately 20-25 homes that are at the same elevation or just slightly higher than the Project Area in Inverness Park along Sir Francis Drake Boulevard and along Levee Road near Point Reyes Station. The topography of the Project Area has some effect on noise and soundscape resources, with noise generated by or near the roadways and pastures generally carried upwards towards residences on the Inverness Ridge or Point Reyes Mesa.

Water Resources – Hydraulics and Hydrologic Processes

The complex geologic setting of coastal Marin has resulted in an equally complex and diverse hydrologic setting, characterized by tides, creeks with seasonal and perennial water flow, and abundant groundwater that either remains belowground as aquifers or emerges at the ground surface as seeps and springs. The transition from precipitation- and groundwater-derived freshwater at the headwaters to the tidally dominated outer portion of Tomales Bay and the Pacific Ocean beyond superimposes another layer of complexity defined by salinity, with the inner portions of Tomales Bay representing the brackish interface between marine and freshwater influences. The Project Area represents the largest transitional zones between marine and freshwater influences within the watershed.

The movement of water and sediment through the watershed, from Inverness and Bolinas Ridges to Tomales Bay, relies upon a complex interaction between hydrologic, hydraulic, sediment transport, and geomorphic processes, including precipitation, fog drip, run-off; infiltration; evaporation; flooding; connectivity of the stream with the floodplain; sediment transport; surface water interaction with the groundwater table; lateral creek migration, scour and deposition, etc. For the purposes of this document, all of these processes are collectively referred to as "hydrologic processes."

The purpose of the project is to restore tidal and freshwater hydrologic processes within the Project Area. Being at the head of the Tomales Bay estuary, both tidal and freshwater hydrologic processes are important to the Project Area and are the cornerstone for almost of the other functions provided by wetland ecosystems.

These processes not only result in important hydrologic functions such as floodwater retention, groundwater recharge, and water quality improvement, but are integral to ecological functions (e.g., carbon export and wildlife habitat) and economic services (e.g., recreation and industries such as oyster-growing and fisheries). Realizing the importance of natural hydrologic processes to wetland function, the Park Service and CSLC focused on removing impediments to tides and creeks as the project's primary goal.

Regulatory and Policy Setting

While water quality and impacts to wetlands are highly regulated, hydrologic processes have received less regulatory attention. In recent decades, more local, state, and federal agencies have adopted policies regarding hydrologic processes.

The 2001 National Park Service Management Policies, support practices that "re-establish natural functions and processes in human-disturbed components of natural systems in parks unless otherwise directed by Congress…..Impacts to natural systems resulting from human disturbances include .....changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return human-disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated"(NPS 2001a, Section 4.1.5). The 2001 Management Policies also call for parks to "protect, preserve, and restore the natural resources and functions of floodplains (NPS 2001a, Section 4.6.4)," which includes benefits such as floodwater storage.

Marin County also promotes restoration and enhancement of watersheds and natural stream channel function (including protection and enhancement of fish habitat) in its draft update of the Countywide Plan (2005). In the Coastal Zone, the LCP (Marin County Comprehensive Planning Department 1981) also includes policies regarding stream alterations, including protection of stream channels from impoundments, diversions, channelizations, or other substantial alterations, as well as protection of at least 100 feet on either side of creeks as "buffers" to increase wildlife habitat quality and water quality benefits. The Point Reyes Station Community Plan (Marin County Community Planning Department 2001) further supports preservation of streams and streamside environments in their natural conditions, including protection of existing riparian habitat or "buffers" and removal of invasive plant species, and protection of Lagunitas Creek, specifically its water quality, coho salmon and steelhead populations, and other aquatic life in its policies.

Water Resources – Tidal and Freshwater Flows

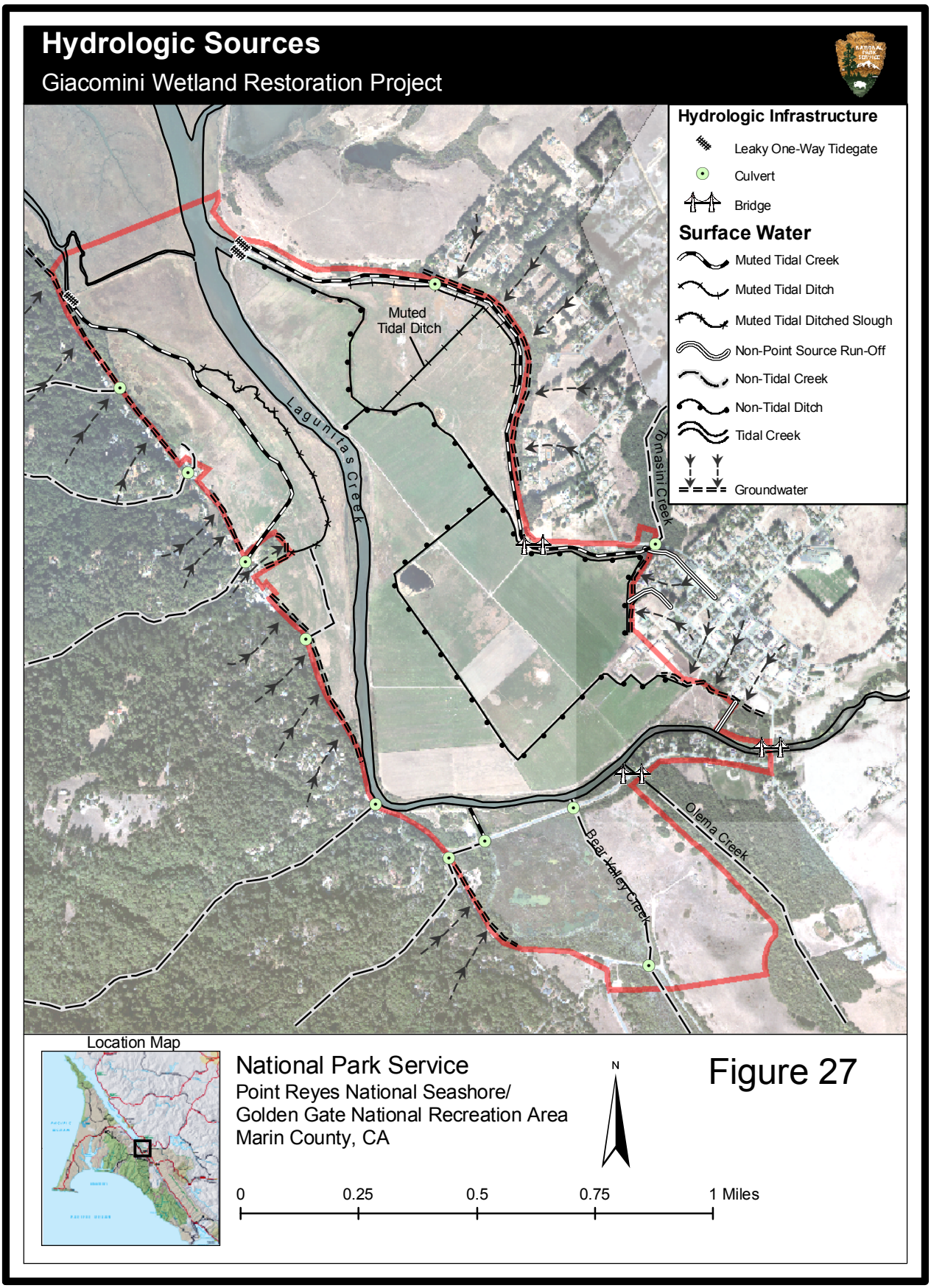
The Project Area represents a mixture of tidal, freshwater creek or fluvial, and groundwater hydrologic sources (Figure 27). The zone of influence for each of these hydrologic influences shows considerable overlap within the Project Area, making it a very hydrologically dynamic and complex system. A more detailed description of each of these sources follows below.

As described earlier, the functionality of wetlands is integrally tied to the presence of hydrologic sources such as tides, fluvial or creek flow, and groundwater. The importance of hydrology not only relates to it being a source of water for wetlands, but to its properties and the work accomplished by water when it moves either through bi-directional flow of tides or the uni-directional flow of creeks and groundwater.

Tidal Surface Water

Tomales Bay. Tides represent a source of energy to estuaries that provides oxygen, sediment movement, and, to some degree, nutrients. Tomales Bay is a 10.8 square-mile shallow, tectonically caused (drowned fault valley) Mediterranean-type coastal estuary (Hollibaugh et al. 1988). Tomales Bay opens at the southern end of Bodega Bay and extends in a southeasterly direction. The bay is approximately 12 miles long and less than one mile wide (RWQCB 2001). The average depth of the bay is less than 20 feet (California Department of Health Services (DHS) 1996; TBWC 2002).

Tomales Bay is a microtidal estuary, which means that the differences between high and low tide are not as pronounced as in other regions of the world such as Alaska's Bay of Fundy, although mesotidal-type tides occur during extreme spring tides in the winter (Harcourt-Baldwin 2003). Within Tomales Bay, the average annual maximum tidal swing is 8.2 feet, with a difference between mean high and mean low tide of about


Hydrologic Sources
Giacomini Wetland Restoration Project
Hydrologic Infrastructure
Leaky One-Way Tidegate
Culvert
Bridge
Surface Water
Muted Tidal Creek
Muted Tidal Ditch
Muted Tidal Ditched Slough
Non-Point Source Run-Off
Non-Tidal Creek
Non-Tidal Ditch
Tidal Creek
Groundwater
Muted Tidal Ditch
Lagunitas Creek
Tomasini Creek
Olema Creek
Bear Valley Creek
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 27

3.61 feet (KHE 2006a). Tides in Tomales Bay are mixed semi-diurnal, resulting in a daily tidal regime with two flood or "high water" tides and two neap or "low water" tides of varying height or magnitude (KHE 2006a). Relative to the Pacific Ocean, tides are attenuated somewhat in Tomales Bay, with the height of the high tide being generally 0.6 feet less than that at the Golden Gate (KHE 2006a). Tidal prism -- or the volume of water that is exchanged during the typical half-day tide cycle -- has currently been estimated at 990.4 million cubic feet in Tomales Bay, compared to 1.8 billion cubic feet for south San Francisco Bay (CH2M Hill 1990; Watson et al. 1998) and 70.6 billion cubic feet for the entirety of the San Francisco Bay (Barnard et. al. 2006).

Tomales Bay is a relatively well-studied system for a small estuary. Previous hydrographic studies conducted as part of the Land-Margin Ecosystem Research (LMER) program of Tomales Bay have documented the bay's metabolism, its water composition, the dynamics of its nutrient circulation, and the influence of coastal upwelling (TBWC 2003). One of the first such studies was a 1960 hydrographic survey by Johnson and colleagues (Johnson et al. 1961). Additionally, Tomales Bay has been the subject of an intensive study into the biogeochemistry, for example, (Smith et al. 1987; 1989; 1991; 1996) (Hollibaugh et al. 1988; 1991) and hydrologic dynamics (Hearn and Largier 1997; Largier et al. 1997a; 1997b; Harcourt-Baldwin 2003) of estuaries. Cole et al. (1990) studied the hydrographic, biological and nutrient properties of Tomales Bay. Chambers et al. (1995) studied the nitrogen and phosphorus dynamics in fringing tidal marshes of the bay.

Circulation – and, therefore, sediment, nutrient, and contaminant dynamics -- in Tomales Bay are predominantly influenced by the Bay's physical shape, tidal cycles, and watershed run-off (TBWC 2003). Historically, circulation within the bay has been characterized as alternating between a classical estuary (net dilutive or "positive" basin) during wet winter months and a hypersaline estuary (net evaporative or "negative" basin) during dry summer months (Hollibaugh et al. 1988). However, as with many other estuaries, advances in computer modeling such as three-dimensional modeling using detailed bathymetric or bottom topography data has revealed that circulation patterns within Tomales Bay and many estuaries are incredibly complex, both spatially and temporally. Several recently developed 3-D hydrodynamic models of Tomales Bay have shown that different transport mechanisms are important in the outer and inner regions of the Bay (Harcourt-Baldwin 2003, (Gross and Stacey 2003).

Tides represent a source of energy to estuaries that provides oxygen, sediment movement, and, to some degree, nutrients.

Gross and Stacey (2003) have developed a three-dimensional hydrodynamic model of Tomales Bay using the TRIM (Tidal, Residual, and Intertidal Mudflat) program through a contract with the San Francisco RWQCB that will provide information to staff that can be used to establish Total Maximum Daily Load (TMDL) goals for loading of pollutants to Tomales Bay. Harcourt-Baldwin (2003) generated a three-dimensional model using a different program as part of Largier's hydrodynamic research conducted as part of Smith and Hollibaugh's LMER studies referenced above. Tomales Bay is often divided into two or three regions – outer, inner, and sometimes middle bays – that are distinguished by differences in bathymetry and distance from its relatively narrow mouth. Most of these models do not incorporate what might be termed the "inner" inner bay, which would cover the Project Area and the undiked marsh north of the Giacomini Ranch, which is shallower, more vegetated, and driven more by fluvial- or creek processes than the open water portions of Tomales Bay (KHE 2006a; see Project Area discussion below).

In the outer portion of the bay, which is characterized by deep channels and shallow shoals or sandbars and strong tidal currents, tides drive the circulation (Harcourt-Baldwin 2003, Gross and Stacey 2003), although heavy freshwater inflows may temporarily affect circulation patterns (Harcourt-Baldwin 2003). Maximum velocities at the mouth are 6.56 feet/second, but these are reduced over neap tides (Harcourt-Baldwin 2003). These strong tidal currents result in complete vertical mixing of waters such at that stratification of tidal and freshwater flows seldom last longer than a day (Harcourt-Baldwin 2003). These modeling results support earlier research that concluded that water in the northern 3.73 miles of the bay exchanges with nearshore coastal waters on each tidal cycle (Hollibaugh et al. 1988). As distance increases from the mouth, the importance of tidal currents decreases relative to other mechanisms, including differences in density between the less-dense freshwater inflow and the more-dense saltwater tides (Harcourt-Baldwin 2003).

In the middle and inner portions of the bay, which are more uniformly shallow than the outer bay, density-driven flow circulation is the dominant process controlling water movement (Harcourt-Baldwin 2003, Gross and Stacey 2003). During the winter, the classic estuarine circulation pattern of gravitational circulation prevails, with less dense freshwater flowing over more dense seawater. Winter freshwater inflow enters Tomales Bay from two primary sources -- Lagunitas Creek near the Project Area and the head of the bay and Walker Creek near the mouth, generally creating a "lens" or layer of the less-dense freshwater on the surface and more dense seawater on the bottom. Lagunitas Creek accounts for 66 percent of the freshwater inflow to Tomales Bay, while Walker Creek represents approximately 25 percent, with the rest of the freshwater inflow coming from the numerous small tributaries to the Bay (Fischer et al. 1996).

The strength and persistence of the stratification depends on the intensity and duration of the freshwater inflow (Harcourt-Baldwin 2003). The estuary rapidly (< 1 day) returns to initial conditions after small freshwater inflow events (Harcourt-Baldwin 2003). After continuous or high inflow events characteristic of the Mediterranean climate's wet winters, continuous freshwater inflow sustains stratification of the middle and inner regions (Harcourt-Baldwin 2003). Recent research in other estuarine systems, including San Francisco Bay, has shown that seasonal variability in stratification may also be accompanied by finer scale variation related to depth and tidal cycle, with unstratified conditions developing during spring tides or in shallower areas of channels and bays (Schoellhamer and Burau 1998). Spatial and temporal variability in stratification within Tomales Bay may result not only from factors such as depth and tidal cycle, but differences in freshwater inflow dynamics following storm events.

While Walker Creek and other small drainages flow into Tomales Bay along its entire length, two-thirds of the Bay's freshwater inflow comes from Lagunitas Creek at the head or southern portion of the bay (Fischer et al. 1996). This large volume of freshwater inflow creates a longitudinal salinity gradient between the southern end or head of the Bay and the northern end or mouth to the Pacific Ocean (Harcourt-Baldwin 2003). This gradient increases flushing or seaward movement of estuarine waters and increases exchange between the middle and outer estuarine regions.

The importance of gravitational circulation within the middle and inner bays decreases during the late spring and summer (Harcourt-Baldwin 2003). As freshwater inflow decreases over the summer, and evaporation increases, estuarine salinity in the middle and inner bays increases, reducing the longitudinal salinity gradient and, consequently, stratification based on difference in density between salt- and fresh waters (Harcourt-Baldwin 2003). The lack of a strong longitudinal salinity gradient within Tomales Bay decreases flushing times from a few days during the winter to approximately 120 days for at least the southern 9 miles of the bay during the summer (Hollibaugh et al. 1988).

In contrast to many other estuaries, however, the density gradient within the estuary does not disappear during the summer, but rather switches from a salinity-driven one to a temperature-driven one (Harcourt-Baldwin 2003). The temperature gradient balances warm temperatures in the middle and possibly inner Bay, which is shallow and more responsive to solar radiation, with upwelling of cold waters in the nearshore Pacific Ocean. Due to strong, persistent offshore winds that churn bottom ocean waters towards the surface during the spring and summer, cold, nutrient-rich water is upwelled along California's central coast (Smith and Hollibaugh 1998, Harcourt-Baldin 2003). The dense, cold upwelling water moves some distance landwards into the estuary with flood tides as a bottom current due to the fact that cold waters are denser than warm surface waters (Harcourt-Baldwin 2003). Significant subtidal intrusions of cold water have been observed a few times during some summers, with colder waters penetrating halfway into the middle and inner bays (Harcourt-Baldwin 2003). These intrusions may represent key sources of nutrients, particularly organic carbon, during the summer to the estuary (Harcourt-Baldwin 2003). Additionally, this longitudinal temperature gradient maintains some type of exchange of waters between at least the outer and middle portions of the Bay (Harcourt-Baldwin 2003), which has important implications for summer water quality. Unlike many other shallow estuaries, including portions of San Francisco Bay, the strong spring winds along the coast, which, on average, can reach as high as 35 miles per hour (mph), do not appear to have a substantial effect on circulation within the Bay (i.e., inducing strong vertical mixing or turnover of waters), perhaps because of the sheltering effect of the steep Inverness Ridge along the western perimeter (Tomales Bay Shellfish Technical Advisory Committee (TBSTAC) 2000).

The very innermost portions of Tomales Bay do not appear to be affected by intrusions of upwelling water, and the lack of a strong salinity or temperature gradient with the middle and outer bays can substantially decrease exchange and increase water residence times (Hearn and Largier 1997; Largier et al. 1997). The

lack of connection with the ocean and outer bay can result in at least transient periods of hypersaline conditions, such that salinities slightly exceed salinity in the outer Bay or ocean because solar radiation increases evaporation of waters and concentration of existing salts (Hearn and Largier 1997, Largier et al. 1997). However, despite increases in salinity and temperature relative to the middle and outer bays, longitudinal salinity and temperatures are too weak to increase exchange. This weak temperature gradient between inner and outer portions of the Bay disappears during autumn, when solar radiation decreases, and water temperatures cool in the inner Bay (Harcourt-Baldwin 2003).

Occasionally, this autumn cooling, combined with hypersaline conditions, causes yet another circulation pattern to develop for several days that is common in more tropical estuaries, inverse circulation (Harcourt-Baldwin 2003). Inverse circulation results from evaporation concentrating salts in the now cooler surface waters, which then, because of higher density, sink to the bottom and flow oceanward beneath the less dense ocean waters. Hearn and Largier (1997) speculated that the degree of hypersalinity and the duration of inverse circulation, which results in greater exchange between inner and outer portions of the Bay, may have been greater during historic times than now. This change appears to have occurred, because the Bay has become shallower, and because minimum flow requirements within creeks cause reservoir releases of freshwater throughout the summer, decreasing salinities in the inner Bay (Hearn and Largier 1997, Largier et al. 1997).

In addition to changes resulting from sedimentation, circulation patterns within Tomales Bay also have the potential to be affected by sea level rise. In the 1993 feasibility study (PWA et al. 1993), sea level was predicted to rise at a rate somewhere between 1.5 and 5.0 feet over the next 100 years. NOAA reports that, based on review of historic (1854-1999) water level gauge data, sea level has risen at a rate of 0.00328 to 0.0079 feet/year over the last century and that sea levels have risen 0.007 feet/year in San Francisco since 1906 (NOAA 2001) *in* KHE 2006a). Based on 25 years of Point Reyes water level records, NOAA predicts a local sea level rise rate of 0.0082 feet/year in this region (NOAA 2001 *in* KHE 2006a). Based on recent satellite altimetry studies, Cazenave and Narem (2004) report a "very accurate" sea level rise rate of 0.0092 ± 0.0013 feet/year for the 1993-2003 decade. This rate is notably higher than what NOAA's rate of change based on measured changes in tide gauges over the preceding half century (KHE 2006a). In 2005, the USGS completed a relative coastal vulnerability study that depicted most of Tomales Bay as having low to moderate vulnerability to sea level rise (Pendleton et al. 2005). Most recently, researchers from University of Arizona, the National Center of Atmospheric Research, and other institutions suggest that accelerated melting of the Arctic and Antarctic ice caps and Greenland glaciers could raise sea level by as much as 3 feet by the end of this century and 13 to 20 feet in coming centuries (Overpeck et al. 2006; Velicogna and Wahr 2006).

Ultimately, circulation patterns within estuaries drive not only on the movement and exchange of tidal and freshwater within a system, but the movement and deposition of suspended sediment and associated nutrients and contaminants and even the abundance and diversity of biota such as phytoplankton, zooplankton, invertebrates, and fish. These relationships result from the hydrodynamic effects of circulation patterns such as landward movement of ocean currents, vertical mixing of surface and bottom waters, net upward currents, and salinity structure of waters, particularly low salinity or transitional zones (Kimmerer 2004). Kimmerer (2004) recently summarized decades of research on relationships between suspended sediment and biota and circulation and/or salinity patterns in San Francisco Bay, and another LMER project in the Columbia River Estuary in Oregon has also extensively investigated this estuarine phenomenon. This subject is discussed further under Water Resources – Water Salinity and Estuarine Turbidity Maxima.

Lagunitas Creek. While earlier studies reference the "Inner Bay" of the Tomales Bay watershed, the boundaries for most of these studies or models end well ocean-ward of the Project Area. The Project Area is located in an area of the estuary that would constitute what could be called the "Inner Inner Bay." This "Inner Inner Bay" represents one of the largest estuarine transition zones in Tomales Bay, areas characterized by the dynamic interface both seasonally and interannually between freshwater and saltwater. This portion of the Bay is characterized by even shallower bathymetry than the Inner Bay, prominent gravel and sand bars in creek channels, and large expanses of undiked tidal marsh and intertidal mudflat, some of which is being actively colonized by Pacific cordgrass (*Spartina foliosa*). In actuality, the "Inner Inner Bay" is part of the Lagunitas Creek – and, to a lesser extent, Fish Hatchery Creek – alluvial delta and is, therefore, dominated more by fluvial than tidal processes (KHE 2006a). The portion of Lagunitas Creek in the Project Area bisects the Giacomini Ranch into two "pastures:" East and West (Figures 2, 27).

The importance of fluvial geomorphic processes within the tidally influenced sections of Lagunitas Creek is evident in the series of gravel and sand bars that have formed from the Green Bridge to the open water portions of Tomales Bay in response to episodic flooding. These gravel and sand bars strongly regulate circulation patterns in this reach of Lagunitas Creek. As with any dam, gravel bars or sills in estuaries can impound waters and disrupt tidal circulation patterns through causing tidal truncation or reduction in the extent of drainage during low tides and increasing water residence time. While, from a tidal perspective, these sills limit drainage during low tides and decrease the amount of exposed mudflat available for species such as shorebirds, from a fluvial perspective, these sills create deepwater, almost lagoonal-type pools that are somewhat analogous in function to pools found in creeks in the upper portion of the watershed. Both types of pools provide important permanently flooded habitat for many aquatic species. Retention of water upstream of gravel bars can reduce water quality through decreasing dissolved oxygen concentrations, but tidal exchange during high tides can decrease the potential for stagnant conditions to develop.

There are two major gravel or sand bars within the Project Area that truncate the lower range of tides and control the depth of upstream residual pools: one is located near where the Giacomini Ranch cows cross Lagunitas Creek to reach the West Pasture (cattle crossing), and the other occurs just south or upstream of the Giacomini Ranch north levee. Within this section of creek, the gravel bars appear to function as a series of "dams" that truncate tidal amplitude and preclude upstream waters from draining completely.

TABLE 7. TIDAL DATUMS FOR NOAA TIDE GAUGE, TOMALES BAY AT INVERNESS TIDAL EPOCH: 1960-78

	MLLW Datum (feet)	NAVD88 Datum (feet)
MHHW	5.34	5.83
MHW	4.64	5.13
MTL	2.76	3.25
NGVD29	2.15	2.64
MLW	0.88	1.37
MLLW	0.00	0.49

A comparison of water levels between the nearest NOAA tidal gauging station in Tomales Bay, Inverness Park (Table 7: Datums), and the portion of Lagunitas Creek within the Project Area indicate that, while the stream gradient is relatively flat through the Project Area, the lower range of tidal amplitude becomes progressively more truncated as distance from Tomales Bay increases (KHE 2006a; Figure 28). Figure 28 is a schematic longitudinal profile of channel bed and top of bank elevations, as well as water levels, along Lagunitas Creek through the Project Area from the Green Bridge at the southeastern end of the Project Area to the Ranch's northern levees at the northern end of the Project Area. This graphic shows the weir-type effect that these gravel bars have on water levels, with the base or minimum water levels observed increasing in elevation in a step-wise manner in an upstream direction (KHE 2006a). There is only a very small truncation of high tides or the upper part of the tidal range, with high water levels the portion of Lagunitas Creek within the Project Area relatively similar to those predicted at Inverness (KHE 2006a). This information suggests that MLW and MLLW elevations for the portion of Lagunitas Creek in the Project Area would differ from that of the predicted tides at Inverness, but the other tidal elevations would remain similar (KHE 2006a).

Typically, at MHW, tidal waters would begin to flood onto marshplains. However, in the reach of Lagunitas Creek within the Project Area, the Giacomini Ranch levees preclude tidal inundation of its historic marshplains. In addition, past deposition of fill in the Green Bridge County Park and White House Pool County Park have also largely eliminated the potential for tidal influence at higher tides in these historic marsh areas. A list of infrastructure and management practices that negatively affect both tidal and fluvial or freshwater hydrologic processes can be found in Table 8. Between Tomales Bay and White House Pool, Lagunitas Creek is wide and relatively uniform in shallowness, although deeper portions of the channel or thalwegs do occur.

The broad and long gravel bar just south of the Giacomini Ranch north levee controls the lowest water level observed between the north levee and the cattle crossing location so that water levels do not drop below approximately 1.9-feet NAVD88, even though portions of the channel are 0-feet NAVD88 (KHE 2006a; Figure 28). As will be discussed in more detail under Water Resources – Water Salinity, circulation patterns within this reach vary seasonally, but, based on long term monitoring data, are typically either well-mixed (fresh in the winter and saline in the late summer-fall) or partially stratified (partial stratification of freshwater at the water surface), although strong stratification occurred very infrequently. The shallowness of this reach, combined potentially with currents and wind, appear to discourage stratification.

Upstream of the cattle crossing location and another prominent gravel bar, the creek becomes noticeably narrower and deeper, functioning almost like what is called a glide with relatively deep water and low

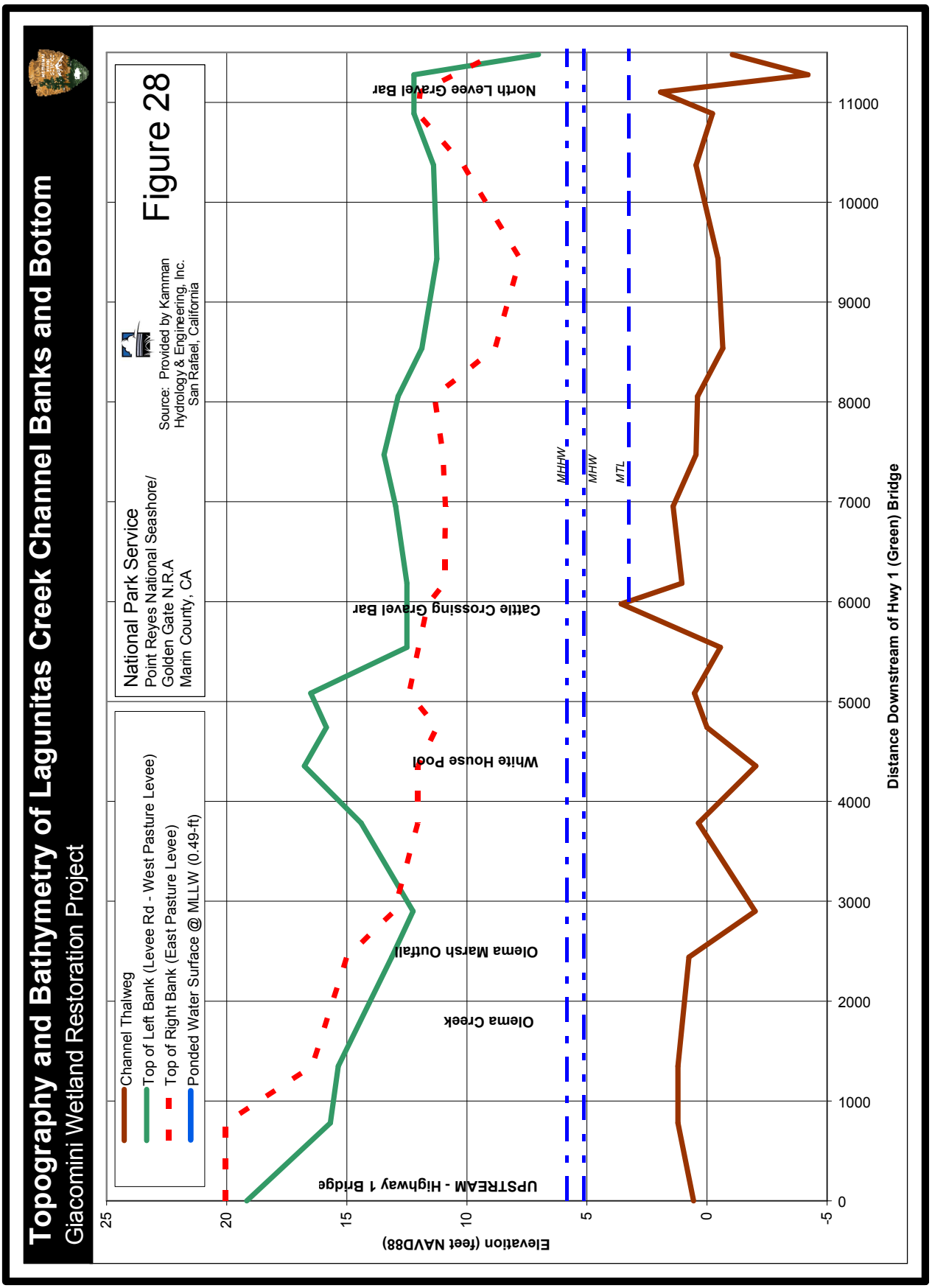

Topography and Bathymetry of Lagunitas Creek Channel Banks and Bottom
Giacomini Wetland Restoration Project
Figure 28
National Park Service
Point Reyes National Seashore/
Golden Gate N.R.A
Marin County, CA
Source: Provided by Kamman
Hydrology & Engineering, Inc.
San Rafael, California
Channel Thalweg
Top of Left Bank (Levee Rd - West Pasture Levee)
Top of Right Bank (East Pasture Levee)
Ponded Water Surface @ MLLW (0.49-ft)
UPSTREAM - Highway 1 Bridge
Olema Creek
Olema Marsh Outfall
White House Pool
Cattle Crossing Gravel Bar
North Levee Gravel Bar
MHHW
MHW
MTL
Elevation (feet NAVD88)
Distance Downstream of Hwy 1 (Green) Bridge
25
20
15
10
5
0
-5
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000

TABLE 8. HYDROLOGIC INFRASTRUCTURE AND MANAGEMENT PRACTICES IMPACTING IMPEDIMENT SURFACE FRESHWATER HYDROLOGIC PROCESSES IN THE PROJECT AREA AND UPSTREAM PORTIONS OF THE WATERSHED

Note: For larger creeks, only impediments on mainstem or central portions of creek are listed. Impediments are listed from upstream to downstream. Multiple similar impediments in the same area of watershed are sometimes denoted by total number of impediments in parentheses, for example (2).

Creek	**Project Area**: Hydrologic Infrastructure/ Management Impediment: Approximate Location	**Upper Watershed**: Hydrologic Infrastructure/ Management Impediment: Approximate Location
Mainstem Lagunitas Creek	1. ***Bridge***: Green Bridge at State Route 1 2. ***Levees***: Past Fill Placement on Green Bridge County Park, Levee Road, East Pasture Levee and Creek Bank Fill, Past Fill Placement on White House Pool County Park, West Pasture Levee (5) 3. ***Management***: Giacomini Cattle Crossing 4. ***Management***: Infrequent Discharge of Ditch Water to Creek 5. ***Management***: Levee Maintenance – East Pasture 6. ***Management***: Levee Maintenance – West Pasture	1. ***Dams***: Lagunitas, Phoenix, Alpine, Kent, Nicasio (5) 2. ***Levees***: Sir Francis Drake Blvd and Historic Railroad Grade (2) 3. ***Floodplain Development***: Samuel P. Taylor State Park 4. ***Levee***: Platform Bridge Road 5. ***Bridges***: SFD at Platform and Pt. Reyes-Petaluma Road (2) 6. ***Floodplain Development***: Sand Processing Plant 7. ***Water Diversion***: Gallagher, Downey Well, and Coast Guard Wells (4) 8. ***Water Diversion***: Genazzi Ranch 9. ***Management***: Cattle in creek at Genazzi Ranch
Mainstem Bear Valley Creek	1. ***Culverts***: Bear Valley Road, Levee Road, Former west outlet – Bear Valley Creek, Silver Hills drainage (4) 2. ***Levees***: **Bear Valley Road**, Olema Marsh parking, **Past Fill Placement in north portion of Olema Marsh near Levee Road**, **Levee Road**, Past Fill Placement in White House Pool County Park (5) 3. ***Management***: Dredge former west outlet at Bear Valley Creek 4. ***Bridge***: Footbridge in White House Pool County Park 5. ***Floodplain Development***: WHP park	1. ***Levees***: Bear Valley Trail, Bear Valley Road (see Project Area), Limantour Road, Past Fill Placement on west side of creek (4) 2. ***Culverts***: Bear Valley Trail, Rift Zone Trail, Vendanta Ranch, Red Barn Road, Visitor Center's Road (5) 3. ***Water Diversion***: NMWD right, but no use 4. ***Floodplain Development***: Seashore Headquarters Complex 5. ***Creek Realignment***: Maintenance Yard 6. ***Floodplain Development***: Maintenance Yard 7. ***Management***: Dredged below Maintenance Yard
Tomasini Creek	1. ***Water Diversions***: at north end near outlet to Tomales Bay 2. ***Culvert***: Mesa Road 3. ***Levees***: Mesa Road, Tomasini Creek berm, Past Fill Placement on North Side at RR Grade 4. ***Bridge***: at Hunt Lodge 5. ***Management***: Levee Maintenance 6. ***Tidegate/Culvert***: at East Pasture North Levee	1. ***Water Diversion***s (2) 2. ***Culvert***: Road crossing on tributary (3) 3. ***Levee***: Ranch Road 4. ***Dams***: West Marin Landfill Ponds (2), Livestock ponds (2) 5. ***Culvert***: State Route 1 crossing
Fish Hatchery Creek	1. ***Culvert***: Sir Francis Drake 2. ***Floodplain Development***: Private Residence 3. ***Management***: Dredging downstream of SFD 4. ***Water Diversion***: Giacomini Ranch 5. ***Management***: Maintain Creek Crossing 6. ***Tidegate/Culvert***: at West Pasture North Levee 7. ***Management***: Cattle in creek	1. ***Water Right Diversions*** (3) 2. ***Culverts***: Vallejo Avenue road crossings of mainstem and tributary (5) 3. ***Levee***: Vallejo Avenue 4. ***Floodplain Development***: Homes (3) 5. ***Bridge***: Driveway crossing of mainstem creek 6. ***Floodplain Development***: Commercial and residential development near Sir Francis Drake Boulevard (15) 7.
1906 Drainage	1. ***Culvert***: San Francis Drake 2. ***Realigned Channel***: Private Residence 3. ***Floodplain Development***: Private Residences (2) 4. ***Culvert***: into West Pasture 5. ***Realigned Channel***: West Pasture 6. ***Management***: Dredging downstream of residence 7. ***Floodplain Development***: Dredge spoil disposal area 8. ***Management***: Cattle in creek	1. ***Culvert***: Private Road Crossing 2. ***Levee***: Private Road 3. ***Floodplain Development***: Private residences (2) 4. ***Realigned Channel***: Ditched on north side of Sir Francis Drake

velocities. The cattle crossing gravel bar again increases the amount of truncation in the observed low or minimum tidal water levels within Lagunitas Creek at approximately 2.8-feet NAVD88 (KHE 2006a; Figure 28). Circulation patterns within this reach differ noticeably from those downstream. While both upstream and downstream reaches are well-mixed and fresh during winter and spring, the White House Pool reach becomes strongly to at least partially stratified during summer and fall, probably due to the decreasing, but continued, influence of freshwater inflows. The degree of stratification may also be driven by tidal cycle, as other researchers have noted more stratification during neap tides or low tide conditions (Reed and Donovan 1994; Schoellhamer 2001).

Stratification within this reach during summer and fall could result either from reestablishment of gravitational or classic estuarine circulation driven by the opposing forces of tidal currents and freshwater inflows – the pattern in much of the open waters of Tomales Bay – or stratification or resorting of "pooled" waters based simply on vertical differences in density. While the strength of tidal currents decreases at least by tenfold in the "inner" bay relative to the mouth of Tomales Bay (Smith et al. 1971), the presence of longitudinal salinity gradient between the Green Bridge and White House Pool during the summer and fall suggests that gravitational circulation might be occurring despite the shoaling effect on tidal flows caused by the downstream shallow creek channel and gravel bars. Longitudinal salinity gradients, particularly strong gradients, are associated with gravitational circulation patterns (D. Schoellhamer, USGS, *pers. comm*.).

Near the Green Bridge, Lagunitas Creek is primarily a fluvial system. Scour pools within this reach appear to be partially stratified for most of the summer and fall, although strong stratification may occur during higher high tides. Even further upstream, Lagunitas Creek begins to transition into more of a freshwater system influenced by tides such that there is, at least in downstream portions near the Coast Guard wells, a time lag between increases in water levels from tides and the subsequent shift from freshwater (salinities < 0.5 parts per thousand or ppt) to brackish water (salinities ≥ 0.5 and < 2.0 parts per thousand or ppt) conditions (KHE, unpub. data).

Fish Hatchery Creek. Fish Hatchery Creek is the primary tributary within the West Pasture of the Giacomini Ranch (Figure 27). The Giacominis installed a one-way tidegate in the West Pasture north levee near Sir Francis Drake Boulevard, however, at some point, this gate began to malfunction and allow some tidal waters into the pasture (Table 8). Muted tidal flushing in the West Pasture has resulted in reduced tidal prism, with prism currently estimated at 8.1 acre-feet at MHW based on hydrologic modeling (KHE 2006a).

Beyond the Giacomini Ranch, Fish Hatchery Creek continues to run along the western perimeter of Tomales Bay until it reaches the Bay itself. As with Lagunitas Creek, gravel bars within the undiked portion of Fish Hatchery Creek also appear to act as small "weirs," controlling the lower tidal range in the southern sections of the creek (KHE 2006a). Just downstream of the Giacomini Ranch, low tides are controlled at approximately 3.0-feet NAVD88 (KHE 2006a).

The tidegates on Fish Hatchery Creek in the West Pasture reduce amplitude of both the low and high tides (KHE 2006a). The lowest water levels measured just inside the West Pasture in Fish Hatchery Creek are 3.25 feet NAVD88 (KHE 2006a). This attenuation continues as the stream gradient increases, with the lowest water levels measured on a tributary to Fish Hatchery Creek, the West Pasture Old Slough, at 4.0 feet NAVD88 midway through the West Pasture (KHE 2006a). The tidegates also truncate the upper portion of the tidal range, peaking at approximately 5.25 feet NAVD88 (KHE 2006a). In 2003, the tidegates on Fish Hatchery collapsed and began to erode the levee. During this period, the malfunctioning appeared to allow more even tidal exchange than occurred previously, including into large portions of the West Pasture freshwater marsh (See more detailed discussion under Giacomini Ranch and Water Salinity). After the tidegates were replaced in the fall of 2003, tidal exchange decreased again (KHE 2006a).

Fish Hatchery Creek tidegate

Circulation patterns in Fish Hatchery Creek are largely dictated by its shallow nature. Waters are usually shallow (<25 cm) and well-mixed or weakly stratified, although strong stratification occurs periodically within areas. This periodic stratification results from movement of the "salt wedge," or edge of tidal influence, landward over the season, as the

volume of permanent freshwater flows decrease.

The West Pasture Old Slough is a tributary to Fish Hatchery Creek that appears to be a remnant historic tidal slough that has been converted in its upstream reaches into a ditch to channel seasonally high surface run-off from a seep on the Gradjanski property (Figure 27). It connects with Fish Hatchery Creek in the northern portion of the West Pasture, thereby leading to also have a muted tidal regime (Figure 27). The slough is typically well-mixed and strongly brackish to saline (~22.4 to 30 ppt) in the late summer and early fall and either well-mixed or strongly stratified, depending probably on tidal conditions and freshwater inflow, and during the winter, spring, and early summer, when water salinities are fresh to brackish (~0.2 to 21.8 ppt; Parsons, *in prep*.). Salinities are frequently higher in upstream reaches of the slough than in downstream reaches that are closer to the tidegate (Parsons *in prep.*). This pattern in salinities may reflect longer residence time of tidal waters that can extend into this reach, combined with potentially a backwater flooding effect such that lower salinity waters from Fish Hatchery Creek flow back up into the West Pasture Old Slough when seasonal freshwater flows in the slough decrease appreciably (Parsons, *in prep*.).

Tomasini Creek. Tomasini Creek is the primary tributary within the East Pasture of the Giacomini Ranch (Figure 27). As with Fish Hatchery Creek, the tidegate and flashboard dam structure on Tomasini Creek at its outlet to Lagunitas Creek at the north levee has been less than effective in eliminating tidal exchange (Table 8). The gate-dam structure truncates low tides or controls the extent of drainage during low tides to approximately 2.0-feet NAVD88, at least 1- to 2 feet above the deepest portions of the channel (KHE 2006a). However, similar to Lagunitas Creek, there was still substantial tidal exchange over the upper portion of the tidal range, with only minor reduction of the peak flood-tide water levels of less than 0.5-feet (KHE 2006a). Peak high tides within the diked portion of Tomasini Creek reach 7 feet NAVD88 (KHE 2006a). On some of these high tides, waters from Tomasini Creek flood into the East Pasture through a culvert in the Tomasini Creek berm into a borrow ditch that runs along the berm's western side (L. Parsons, NPS, pers. obs.). Monitoring of water levels near the Giacomini Hunt Lodge show tidally driven fluctuations in water level when high tide water levels exceed the base level of 4.5-feet NAVD88 (KHE 2006a).

Based on results of hydraulic and hydrodynamic modeling, the tidegate-dam structure did not appear to be the only feature that is acting to impound water (KHE 2006a). As with Lagunitas and Fish Hatchery Creek, several topographic features within the creek channel appear to be control low or minimum water levels – one between the tidegate and the Giacomini Hunt Lodge and one closer to Mesa Road (KHE 2006a). Close to Mesa Road, an extended debris and sediment jam that is just downstream of the Mesa Road culverts at a point where the creek gradient flattens appears to hydrologically disconnect the lower reach from the upper reach, at least during low flow conditions, thereby limiting water and tidal exchange. Surface water often disappears just below the debris jam during the late summer and fall until the creek reaches the Giacomini Hunt Lodge.

As with Lagunitas and Fish Hatchery Creeks, the creek appears to be well-mixed and largely fresh during the winter and early spring (NPS, unpub. data). Starting in late spring and extending through late fall, most of the creek remains well-mixed -- or at least partially stratified -- but salinities are more brackish, varying both spatially and temporally along the creek, seemingly in response to tidal cycles and decline in surface and subsurface creek flow (NPS, unpub. data). The downstream end near the tidegate is typically well-mixed and brackish throughout the year. Just upstream, the creek is generally well-mixed or partially stratified, but occasionally becomes strongly stratified (NPS, unpub. data). During some of these periods when this reach is strongly stratified, bottom salinities exceed that of upstream and downstream (bayward) monitoring locations, suggesting that saline waters may be pooling in this section of creek, perhaps in response to an earthen sill or other topographic feature downstream. As with Fish Hatchery Creek, a "salt wedge" appears to move up the creek as freshwater inflows decline during the summer and fall. The advance of the "salt wedge" appears to be blocked by the debris and sediment jam south of Mesa Road, however. While early modeling results suggested that, based on creek gradient, tidal influence could extend as far as Mesa Road (KHE, unpub. data), creek waters near Mesa Road are always fresh and well-mixed (NPS, unpub. data).

Another factor that influences salinity in Tomasini Creek is the presence of perennial groundwater flow from the adjacent Point Reyes Mesa (KHE 2006a). Groundwater seepage may contribute to creek hydrology through run-off from hillside springs, seepage along the base of the Mesa, and subsurface groundwater inflow. Salinities simulated from modeling based on creek flows and attenuated tides, but not groundwater, suggests that the contribution from groundwater to the Tomasini Creek water budget may be considerable (KHE 2006a). Based on modeling, salinities near the Giacomini Hunt Lodge during the summertime with typical low

summer flows should range from 20.5 to 25.0 ppt, but actual salinities recorded during monitoring by the Seashore show that salinities range from 15.0 to 18.0 ppt in both surface and bottom waters (KHE 2006a).

Giacomini Ranch. Tidal influence within the West and East Pastures has been significantly minimized through diking and tidegates (Table 8). However, leakiness of the Fish Hatchery Creek tidegate has enabled at least irregular tidal surface overbank flooding of the northern portion of the West Pasture and the northern and central portions of the West Pasture freshwater marsh, as well as depressional features in the central portion of the pasture that appeared to be remnant tidal channels.

West Pasture: Based on water level data collected within the marsh, tidal influence appears to occur in the marsh when tides in the diked area equal or exceed 5.25 feet NAVD88, the maximum tidal range currently permitted by the modified tidegate at the north levee (KHE 2006a). Currently, these tidal events are relatively infrequent and probably only occur when salinities in undiked areas exceed 6.25 to 6.5 feet NAVD88 (KHE 2006a). These extreme high tides occur sporadically throughout the year, but are highest between December and March, when they are often compounded by high volumes of freshwater flow from rainfall. Saltwater entering the freshwater marsh from the north end of the marsh appears to preferentially flow alongside Sir Francis Drake Boulevard before spreading through sheetflow to the central and eastern portions of the marsh, the lowest elevations within the marsh. Because the marsh is a highly vegetated depressional basin, drainage of tidal flows from the marsh does not appear to occur during low tides or even within days as flows recede, but rather to pond for perhaps as long as several months. A more detailed discussion of this occurs in Water Resources –Water Salinity.

East Pasture: The leakiness of the Tomasini Creek tidegate has also created some tidal influence within the diked pasture, albeit more indirectly. On some high tides, waters from Tomasini Creek flood into the East Pasture through a culvert in the Tomasini Creek berm into a borrow ditch that runs along the berm's western side (NPS staff, pers. obs.): these waters often overspill onto the pasture and have created essentially a sparsely vegetated, saline flat that is commonly used during the winter and spring by shorebirds and waterfowl. Some of these waters flow into the pasture's drainage ditch system, which is typically used for storing freshwater for irrigating the pastures during the summer. Otherwise, as with the southern portions of the West Pasture, direct tidal influence may be limited to large storm events that occur during extreme high tides (e.g., 1982 and 2006) that cause overbank flooding of levees into the pastures. Because of the difficulty in estimating waters that enter the East Pasture from Tomasini Creek episodically through this culvert, the very limited tidal prism that does exist currently could not be accurately estimated.

Limited areas of both the East and West Pasture that immediately border Lagunitas Creek also appear to have some very indirect tidal influence through hydraulic connectivity of the pastures' groundwater table with the rise and fall of tides in Lagunitas Creek (See Water Resources – Groundwater for more detailed discussion).

Olema Marsh and Bear Valley Creek. Olema Marsh once represented an integrated tidal marsh complex with the Giacomini Ranch (Figure 21). Tidal influence was believed to extend as far upstream on Bear Valley Creek as the park's administrative headquarters during extreme tide conditions. Construction of the levee across the mouth of Olema Marsh in 1892 for construction of Sir Francis Drake Boulevard or Levee Road hydrologically disconnected the marsh from the Giacomini Ranch (Table 8). While the flow path of Bear Valley Creek through marsh has not remained constant in the intervening years, currently, the box culvert on the downstream end at Levee Road just before the creek's confluence with Lagunitas Creek acts as a grade control structure that reduces the range of tidal exchange into the marsh (KHE 2006a; Figure 27; Table 8). The culvert invert limits tidal exchange to those exceeding 4.5-feet NAVD88 (KHE 2006a). As with many of the other creeks, the culvert does not appear to attenuate or only minimally attenuates affect the upper portion of the tidal range (KHE 2006a). Prior to the 1998 flood, Bear Valley Creek apparently flowed out of a culvert underneath Levee Road that is on the western perimeter of Olema Marsh near the White House Pool County Park (Figure 27). Currently, this channel is disconnected from the marsh through a build-up of sediment between the marsh and the western culvert, and the culvert now only contains flows from the Silver Hills drainage, which has been redirected into a ditch on the south side of Levee Road. Because sediment deposition within the culvert has raised the elevation of its "bottom," tidal influence in the Silver Hills drainage channel would be limited to some of the highest high tide events, exceeding 6.9 ft NAVD88 (~ 7 ft MLLW; G. Kamman, KHE, pers. comm.).

Fluvial Surface Water or Fresh Water

Lagunitas Creek. The 83.1 square mile Lagunitas Creek watershed is the largest watershed in Tomales Bay (KHE 2006a). Two-thirds of the freshwater inflow to Tomales Bay comes from Lagunitas Creek and its tributaries (Fischer et al. 1996). Its tributaries, Olema Creek, Bear Valley Creek, and Haggerty Gulch, are located, from east to west, respectively, along the southern margin of the Project Area. Lagunitas Creek drains the Coast Range mountains located east and southeast of the Project Area (Figure 20). The watershed is underlain by a variety of Franciscan Complex rocks, mostly greywacke and metavolcanics.

Lagunitas Creek is a perennial system. The stream gradient of the creek within the Project Area is relatively flat. Other than the large bend to the west at the south end of the Project Area, its course is relatively straight and lacks sinuosity, as is common with fluvial-dominated deltaic systems. Considerable debate centers around the reason for the large, almost unnatural 90 degree bend in Lagunitas Creek near White House Pool: it may be due to the alluvial fan present near the Giacomini Ranch dairy or related somehow to the fault. The creek is strongly to moderately entrenched in the Project Area due to presence of the Giacomini Ranch levees and steep creek banks on the south side of Lagunitas Creek along Levee Road. East Pasture levees upstream of the old summer dam location range from 14- to 17-feet NAVD88 in height and drop to as low as 8- 10 feet NAVD88 at their northern end (KHE 2006a). Around White House Pool and the location of the old summer dam, the pastures are graded at levels equivalent to adjacent levees, at about 11- to 12 feet NAVD88 in elevation (KHE 2006a).

Much of the area between Levee Road and Lagunitas Creek was filled since construction of the original embankment for what is now Levee Road and is only slightly lower in elevation than the East Pasture levees (~10-11 feet NAVD88). Levee Road itself ranges from 13- to 15 feet NAVD88 in the residential area. The West Pasture levee ranges from 12-feet at the south end to 10-feet at its northern end (KHE 2006a). Beyond the Giacomini Ranch, Lagunitas Creek has formed natural alluvial levees along its creek bank that are considerably lower in elevation (~ 7.1 feet NAVD88; PWA et al. 1993). Despite these geomorphic constraints, Lagunitas Creek still overtops the levees and creek banks with varying frequency (see Water Resources-Floodplains for more discussion). These flows play an important role in sediment delivery and transport through the Project Area, as well as influencing channel, floodplain, and delta form (KHE 2006a).

While flow may be perennial, Lagunitas and other creeks still have flow patterns characteristic of systems in Mediterranean climates. Creek flow, measured at USGS gauging station near Pt. Reyes Station, averages 357 cubic feet per second (cfs) in February to as low 5.5 cfs in September (USGS 2004). During the severe drought of 1976-77, average monthly summer flow rates dropped to as low as 0.45 cfs (KHE 2006a). Flow is now regulated by the State Water Resources Control Board (SWRCB) through Decision 95-17, which has mandated minimum creek base flow at Samuel P. Taylor State park gage during the summer from storage reservoir releases of 8 cfs during normal rainfall years and 6 cfs during dry years. In November, minimum flow requirements increase to 20 and range between 16 to 25 cfs between November and April 30.

Lagunitas Creek inflow to the Project Area has been significantly altered by historic water development in the basin (KHE 2006a). Approximately 70 percent of the waters from this subwatershed are controlled by dams (PWA et al. 1993). A list of infrastructure and management practices affecting fluvial or freshwater creek processes in Project Area subwatersheds can be found in Table 8. Water development was initiated in the Lagunitas Creek watershed with the construction of Lake Lagunitas in 1873 (350 acre-feet [AF] of capacity). This was followed by damming to form Phoenix Lake in 1905 (411 AF of capacity). Beginning in 1875, several water companies were created and provided water to the rural communities of Point Reyes Station, Inverness Park, and Olema (SWRCB 1995). Starting in 1955, flow from about 40 percent of the watershed area started entering six water catchment reservoirs (KHE 2006a). Reservoir construction and expansion continued through 1982 with the following facilities:

- ***Alpine Lake*** (1918) with a capacity of 3069 AF;
- ***Alpine Lake*** expansion to 4600 AF in 1924;
- ***Alpine Lake*** expansion to 8900 AF in 1941;
- ***Kent Lake*** (1953) with a capacity of 16,050 AF;
- ***Nicasio Reservoir*** (1960) with a capacity of 22,430 AF; and
- ***Kent Lake*** expansion to 32,900 AF in 1982.

The effect of these dams on hydrogeomorphic processes of Lagunitas Creek has not been specifically studied. However, in arid portions of the country, dams operated for water supply and/or flood control have resulted in

a reduction in the frequency and strength of peak instantaneous flows, an increase in the duration of bankfull or ordinary high water flows, and a drastic reduction in summer low flows and gravel/sediment recruitment (Fenner et al. 1985; Stromberg and Patten 1990; Johnson 1992; 1994; 1998); Friedman et al. 1998). In additions, dams and levees often reduce the lateral migration rate of meandering systems (Johnson et al. 1971; Bradley and Smith. 1986; Rood and Mahoney 1990; Friedman et al. 1998). Recent studies on Lagunitas Creek have investigated possible problems with a "fining" of the sediment substrate and a reduction in sediment recruitment in the upper reaches downstream of the dams, which may be related to sediment trapping – particularly coarse sediments – by the dams (Stillwater Sciences 2004);. The dams may also be affecting the frequency and intensity of peak flows within the creek ((Stillwater Sciences 2004). As with many other river and creek systems, the effect of damming on the watershed has been compounded by other hydrologic alterations, including past mining of the floodplain terrace for sand (> 2 stream miles upstream from Project Area) and downstream appropriative and riparian water rights stream diversions by property owners.

The Giacominis undertook their own water development for the purpose of irrigating pastures. The following summary is excerpted from a SWRCB water rights hearing report for Lagunitas Creek (1995):

> *"Giacomini…graded and leveled the land, and used water from Lagunitas Creek to leach the salt out of the soil. Giacomini drilled two wells on the southwest portion of the property to obtain water; however, both wells produced water that was too brackish for irrigation. Giacomini then attempted to divert water directly from Lagunitas Creek at the most upstream location adjacent to his property; however, the tidal influence in Lagunitas Creek caused the water to become too salty about May, when the stream flow diminished. Since the mid-1940's, Giacomini has constructed an earthen dam in the creek to prevent saltwater intrusion and to provide freshwater for irrigation."*

The Giacominis diverted water from Lagunitas Creek under claim of a riparian water right (KHE 2006a). An appropriative water right license was also issued by the SWRCB in 1950. The riparian right lays claim to a maximum pumping capacity of 350 cfs year-round. The appropriated right is for 2.67-cfs between May 1 and October 1. In addition to maintaining a freshwater pool for diversion, the Giacomini summer dam ultimately ended up benefiting NMWD by preventing salt water from moving upstream of the Green Bridge during the summer and fall: NMWD constructed groundwater wells for municipal water supply directly upstream of Green Bridge in 1970. The summer dam was historically approximately 100-feet long, 10-feet high, and 60-feet wide at the base. It created a pond that was about 7-feet deep and extended about 1.75-miles upstream, inundating approximately 17 acres (SWRCB 1995). As part of SWRCB Decision 95-17, construction of the dam at this location ended in 1997. The Giacominis now receive irrigation water from the NMWD "Downey" well located approximately 0.9-miles upstream of Green Bridge (Table 8). While the Giacominis continue to manage approximately 2 cfs as part of the ranch's appropriative water right, the irrigation contract commits NMWD to delivery of 1.23 cfs to the Giacominis, but actual delivery is typically closer to 1 cfs (C. DeGabriele, NMWD, pers. comm.). When the Giacomini Ranch is turned over to the Park Service in 2007, irrigation of the pastures will cease, although the contract with NMWD does not terminate until July 1, 2008. Following closure of the ranch, management of the appropriative water right for 2.00 cfs will revert to Park Service management. The remaining 0.67 cfs of the Giacomini's original water right was purchased from the Giacominis by NMWD in the late 1990s.

Olema Creek. Only the mouth of Olema Creek falls within the Project Area, but a short description is provided, because of the creek's size and proximity to the Project Area. It flows directly into Lagunitas Creek just southeast of the Giacomini Ranch old summer dam location. The Olema Creek watershed is an elongated 14.7-square mile drainage basin occupying the San Andreas Fault zone immediately south of the Project Area (KHE 2006a; Figure 27). Olema Creek is the largest tributary to the Lagunitas Creek subwatershed that is not dammed with the Lagunitas Creek confluence near the upstream boundary of the Project Area. The Olema Creek basin is approximately 9-miles long and 1- to 2-miles wide. Approximately 70 percent of the drainage area consists of runoff from the west flanks of Bolinas Ridge, while the remainder of the watershed occupies the eastern slopes of the Inverness Ridge. Within this basin, the Bolinas Ridge is underlain by Franciscan Complex bedrock, and the Inverness Ridge is composed of fine-grained marine sediments of the Tertiary-aged Monterey Formation (see Figure 20). A mixture of modern/historic alluvial, estuarine, and freshwater marsh deposits blankets the valley floor of this drainage.

Stream gradient of Olema Creek near the Project Area is relatively flat, with the creek following a rather straight – and, in some areas, braided – course. In recent years, the channel has aggraded considerably in its lower sections, causing the creek to jump out of its alignment of the past 80 years, and reestablish a

distributary floodplain or network of secondary channels in Stewart Flat in the low-lying floodplains of Olema Creek between the town of Olema and Point Reyes Station. The creek appears to be moving closer toward historic conditions, when moderately sized riparian forests flourished along a somewhat sinuous Olema Creek, as shown in a map of the Berry grant produced in 1854 (Livingston 1995). This depiction is supported by a description by Schofield (1899) of Olema Creek as having banks that are "thickly grown with brush and trees. The last two miles of the creek run through low swampy land, with its banks most of the way heavily lined with willows." Some historical accounts also refer to an "Arroyo Olemus Lake" or Olema Lake, which most likely occurred at Stewart Flat (Niemi and Hall 1996). This "lake" may have been subsequently drained by construction of the Olema Canal, which straightened the section of Olema Creek between Olema and Lagunitas Creek (Niemi and Hall 1996). Currently, Olema Creek is bridged at Levee Road near its confluence with Lagunitas Creek.

The lower two-thirds of the Olema Creek watershed are perennial. The flow is sustained during the summer months principally by the perennial tributaries draining the Inverness Ridge. Tributary streams off the Bolinas Ridge are typically intermittent during the summer months. Streamflows during the winter runoff period, as determined at Olema, typically reflect baseflow conditions of about 5- to 10 cfs, with peak storm flows of several hundred to more than 1,000 cfs (Questa Engineering Corp. 1990). Because of the valley's linear nature, the watershed responds rapidly to rainfall events. Ketcham (1998) indicates that there is an approximate 3-hour lag time on Olema Creek between the onset of significant rainfall events and peak discharge. The estimated mean annual water yield for Olema Creek (at Bear Valley Road) is approximately 20,800 acre-feet (Questa Engineering Corp. 1990). This translates to an average annual flow of just under 29-cfs. However, seasonal flow variability displayed in monitoring data indicates summer baseflow rates ranged 0.1- to 1.0-cfs over dry to near-normal water year types (Questa Engineering Corp. 1990). There is also tidal influence on Olema Creek on the downstream 0.3 miles before it joins with Lagunitas Creek (B. Ketcham, Seashore, *pers. comm*., 2006).

Bear Valley Creek. Similar to Olema Creek, Bear Valley Creek occupies the San Andreas Fault zone valley. Within the fault zone, Bear Valley Creek is separated from Olema Creek by a 120-foot medial ridge composed of marine terrace deposits. Approximately half of the headwaters area of this 4.1-square-mile subwatershed is underlain by Monterey Formation sediments, while the other half lies atop granitic bedrock (KHE 2006a).

Hydrology of this watershed derives not only from surface runoff from the relatively steep upper watershed and more level floodplains in the Olema Valley, but from groundwater originating from the Inverness Ridge. The upper reaches of Bear Valley Creek and its tributaries are single-threaded, moderately entrenched sections that are characterized by a well-defined riparian corridor. These sections are constrained by the steep topography of ravines along Inverness Ridge and the historic ranch roads that are now being used for the Seashore's Bear Valley Trail. The lower portions of Bear Valley Creek consist of single-threaded or multi-threaded channels that are exceptionally shallow. Approximately 2,300 feet upstream of the Bear Valley Road berm, the stream channel becomes indistinct, dissolving into an open water marsh. The stream channel remains indistinct through Olema Marsh until just upstream of Levee Road, where a row of willows and alders marks its course through the Levee Road culverts and County White House Pool park to Lagunitas Creek.

Like the Inverness Ridge tributaries draining the Olema Creek watershed, Bear Valley Creek is a perennial system. No long-term flow monitoring has been completed in the watershed. However, a water supply study completed by the USGS in the mid-1960's does provide some estimates of late-summer creek baseflows or the amount of water in the creek once flooding from rains has ceased (Dale and Rantz 1966). This study indicates that, even though the Bear Valley Creek watershed is just over a quarter of the size of the Olema Creek watershed, summer baseflow rates (measured near Park Headquarters) are of a similar magnitude, ranging from 0.5-cfs during normal rainfall years to 0.25-cfs during dry year-types. The greater yield of Bear Valley relative to Olema reflects the higher water-bearing properties of the deposits underlying the Inverness Ridge relative to the Franciscan complex material underlying ridges to the east of the San Andreas rift valley (KHE 2006a).

Construction of a road parallel to Bear Valley Creek to connect Point Reyes Peninsula with the town of Olema in the 1800s represented the first of many major infrastructure and management impacts that impacted the subwatershed (Table 8). During the 1800s, Bear Valley Creek was described as having numerous riffles and pools underneath a substantial riparian canopy. This fluvial system eventually flowed into Olema Marsh, which was then a large integrated tidal marsh complex with sinuous tidal sloughs (KHE 2006b). In 1892, a long, culverted berm was constructed across the mouth of Olema Marsh for Sir Francis Drake Boulevard or Levee Road. Following construction of Levee Road in the late 1800s- early 1900s, the creek was dammed by dairy ranchers in the 1920s. The SWRCB shows NMWD as having a water right on Bear Valley Creek for

diversion of 0.401 cfs between January 1 and December 31, but NMWD officials clarified that this was only a temporary permit for use in 1977, a drought year, and has not been used since (C. DeGabriele, NMWD, *pers. comm*.). Based on a 1942 photo, this area appears marshy and heavily grazed, and there is little riparian vegetation until the creek approaches Olema Marsh. A number of culverted berms were built for Bear Valley Road and the ranch roads in the upper portion of the watershed, all of which affected hydraulic connectivity and sinuosity. The original road from Olema to the Point Reyes Peninsula was eventually replaced with Bear Valley Road and Sir Francis Drake Boulevard. Limantour Road was constructed after World War II. In the 1970s, the Seashore moved a portion of Bear Valley Creek channel for construction of the maintenance facility yard and buildings. By the early 1980s, maintenance dredging for flood control purposes had led to the middle and lower reaches of Bear Valley Creek becoming deeply incised, with the creek bottom roughly 6-8 feet below the floodplain terrace bank at the Seashore's maintenance yard (KHE 2006b).

In 1982, Bear Valley Creek changed dramatically as a result of the New Year's Day floods. Catastrophic debris flows originating from the unstable weathered granite of the Inverness Ridge flowed through tributaries into the mainstem of Bear Valley Creek, choking the former channel, scouring existing road/trail facilities, and turning the colluvial valley bottom into a sandy, braided stream channel with extensive woody debris jams that acted to temporary dam and pond waters within the channel. Storm clean-up resulted in some of the excavated sediment being placed in the floodplain and possibly on the northern edge of Olema Marsh adjacent to Levee Road (Table 8; KHE 2006b). The State Coastal Conservancy provided funding to Audubon Canyon Ranch in the 1980s for an enhancement project, which consisted principally of using drag-lines to create small, unvegetated ponds in Olema Marsh, some of which still persist today. During the 1998 El Nino events, similar small-scale landslides and hillslope failures were observed throughout the Bear Valley Creek watershed. Sediment deposition during the 1998 flood also precipitated a change in channel course for lower Bear Valley Creek from the west to the east side of Olema Marsh. Since 1982, the County of Marin has also diverted one of the larger drainages to Olema Marsh, Silver Hills, to run alongside Levee Road and flow out of the historic outlet on the west side of the marsh.

While Olema Marsh has been heavily impacted by road construction, long-term water level monitoring in Olema Marsh and lower Bear Valley Creek show that conveyance capacity of the Bear Valley Road culverts is still sufficient to pass most streamflows without problems such as backwater flooding (KHE 2006a). Culverts at Bear Valley Road consist of two 6-foot diameter culverts that have a conveyance capacity of 600 cfs (KHE 2006b). However, water levels in Olema Marsh are dramatically higher than the elevation of the downstream 6-foot by 7-foot box culvert at Levee Road, indicating water impoundment and poor hydraulic connectivity between Olema Marsh and downstream Lagunitas Creek (KHE 2006a). The minimum water surface elevation recorded during baseline studies (8.4-feet NAVD88) in Olema Marsh is almost 4-feet higher than the minimum or base water level elevation recorded immediately upstream of the Levee Road culvert (KHE 2006b).

Outflow appears to be limited by several factors (Table 8). As noted earlier, the 1998 storm caused Bear Valley Creek to migrate from a well-defined channel on the western side of the marsh to a more amorphous, ill-defined flow path on its eastern edge, and sedimentation essentially blocked off the western outlet (KHE 2006b). Blockage of the western outlet reduced the available surface area for potential flow conveyance from the marsh from 106 square feet to 42 square feet, which translates into a reduction in conveyance capacity from approximately 630 - 700 cfs to 410 cfs (KHE 2006a). A 5-year flood event produces approximately 490 cfs in Bear Valley Creek (G. Kamman, KHE, *pers. comm*.). In addition, outflow is also severely reduced by an approximately 315-linear-foot earthen berm hardened by heavy vegetation establishment on the east bank of lower Bear Valley Creek just upstream of Levee Road (KHE 2006b). Problems with conveyance of flows at Levee Road have caused backwater flooding that has increased water levels, as well as in lower Bear Valley Creek (KHE 2006a). Based on a comparison of water levels and culvert submergence conditions at Bear Valley Road in 1990 (Evans 1990) and 2005 (KHE 2006b), standing water levels during the summer appear to have increased approximately 6 feet since 1990, which predated the 1998 flood event and migration of the Bear Valley Creek channel in Olema Marsh (KHE 2006b). Impoundment in Olema Marsh has also resulted in an increase in water surface levels in the Bear Valley Creek marsh directly upstream of Bear Valley Road. Water levels within Olema Marsh (and Bear Valley Creek Marsh) are predicted to continue to increase, which could have a considerable effect on the potential for flooding during storms of Levee and Bear Valley Roads, which are frequently flooded even during smaller storm events.

Tomasini Creek. The Tomasini Creek watershed is over 3.5-miles long, averages 0.75-miles wide, and has an estimated drainage area of 3.3-square miles (KHE 2006a). The upper two-thirds of the watershed consist of Franciscan complex bedrock; the lower third drains lands built on marine terrace deposits that underlie the Point Reyes Mesa (KHE 2006a; Figure 20). Upstream of Mesa Road in property owned by the county as an

open space easement, the creek flows down a moderately sloped section of the Tomasini Creek valley in a shallowly entrenched, albeit well-defined channel through a broad riparian zone until it reaches the road, where backwater flooding from undersized culverts and an abrupt change in creek gradient has caused the creek to broaden and become marshy (Table 8). The creek enters the eastern side of the Project Area through a pair of 6-foot diameter circular steel culverts underneath Mesa Road. From there, the stream gradient flattens considerably, encouraging deposition of sediment and debris that has created a blockage that reduces hydraulic connectivity between upstream and downstream reaches.

Tomasini Creek is contained within a leveed channel along the eastern border of the Project Area to its outfall with Lagunitas Creek near Railroad Point or the north levee of the East Pasture (Table 8). This outfall consists of a 22-foot-wide concrete weir containing a line of four 3-foot-diameter circular culverts equipped with one-way tide gates on downstream ends (KHE 2006a). The Tomasini Creek levee was constructed sometime between 1955 and 1960 (KHE 2006a). This levee was constructed to divert Tomasini Creek out of its natural channel alignment, which meandered through the East Pasture. Review of available historic aerial photographs from 1942 and 1943 indicate that, prior to construction of the current levee, the Giacominis may have attempted to redirect Tomasini Creek in a southward direction along the base of the Mesa below the Giacomini Dairy Facility and through the Green Bridge County Park to an outfall point into Lagunitas Creek opposite Olema Creek (KHE 2006a). The historic outlet of Tomasini Creek into the former marsh floodplain is visible in the 1942 photograph as a sizeable alluvial fan (KHE 2006a).

No flow monitoring has been completed on Tomasini Creek. However, flow characteristics (if not totals) for this drainage are likely similar to those on Walker Creek in the northern portion of the Tomales Bay watershed (KHE 2006a). Based on USGS flow records for Walker Creek, winter runoff characteristics in the Tomasini watershed are probably flashy (i.e., very short lag time between rainfall and runoff) and likely similar in magnitude, per unit area, to those in the lower Lagunitas Creek watershed (KHE 2006a). The flashiness of this system is supported by the Giacominis, who attested to the propensity for Tomasini Creek to have high-intensity, short-duration storms that cause significant flooding, particularly in combination with high tides (KHE 2006a). The largest difference between this drainage and others in the Project Area is that summer baseflow rates are much lower per unit area (KHE 2006a). As with Walker Creek, Tomasini Creek does dry down during average and drier years in late fall (NPS, unpub. data), with sustained year-round flows only occurring during wet-year types. However, groundwater springs and seeps within the Point Reyes Mesa terrace deposits may contribute significantly to the creek base flow during summer and fall, maintaining perennial flow and brackish salinities, at least in downstream reaches (See Water Resources – Groundwater).

Similar to other creeks within the watershed, water is extracted from Tomasini Creek through at least three water rights agreements, primarily during the winter for off-creek storage (Table 8). One of these water rights, which covers storage of 12 acre-feet per year between October 1 and April 1, was transferred to the Park Service with purchase of the Martinelli Ranch. In addition, the creek may be negatively affected by the presence of the now-closed West Marin Landfill within its watershed: the landfill is apparently inundated on occasion by overbank flooding during high flows and may therefore potentially decrease downstream water and sediment quality (Table 8). This issue is discussed in greater detail under Soil Resources and Water Resources – Water Salinity and Quality.

Fish Hatchery Creek and Inverness Ridge Drainages. There are four small watersheds draining Inverness Ridge, which enter the Project Area between White House Pool and the North Levee (Figure 27). These drainages include (from south to north): Haggerty Gulch (1.7-square miles); Fish Hatchery Creek (0.9-square miles); the "Creek 2 or 1906 Drainage" (0.2-square miles); and the "Unnamed Tributary" (less than 0.1-square miles; KHE 2006a). Names for the latter two drainages came from a 1917 National Geodetic Survey map (KHE 2006a). All of these drainages are underlain by weathered granite, and each displays perennial flow and copious winter sediment production. On a per unit area basis, the amount of runoff from each of these small watersheds is similar to that for Bear Valley Creek (KHE 2006a).

All of these drainages are characterized by steep to extremely steep stream gradients as waters flow down ravines on the Inverness Ridge. Within the Project Area, the gradient abruptly flattens, representing active depositional fans. In 1899, Schofield noted that Fish Hatchery Creek was "at first fed by springs and (runs) through cool shady woods,….but on gaining the open valley," it runs through two miles of marshy lowlands. Flows currently enter the Project Area through culverts underneath Sir Francis Drake Boulevard (Table 8). Haggerty Gulch discharges directly into Lagunitas Creek at White House Pool through a 4-foot-diameter circular steel culvert (KHE 2006a; Figure 27), which appears to be at least contributing to some bank erosion

and possible undercutting of the Sir Francis Drake Boulevard road base (Land People 2005). All other drainages flow into the West Pasture or private properties on the east side of Sir Francis Drake Boulevard.

Fish Hatchery Creek enters the Project Area on the north side of the Gradjanski property where it flows to the central portion of the West Pasture (Figure 27). The channel near Sir Francis Drake Boulevard has been frequently dredged to remove sediments deposited during storms by the Giacomini family (Table 8). The channel passes through the West Pasture north levee in a pair of recently replaced 3-foot-diameter circular steel culverts equipped with modified tidegates on the downstream side (Table 8). These flap gates are propped open slightly to permit limited two-way exchange between undiked portion of Fish Hatchery Creek and the West Pasture. As with Lagunitas and Tomasini Creeks, water is extracted from Fish Hatchery Creek through at least four water rights agreements, primarily through direct diversions. NMWD has a water right for 0.666 cfs between January 1 and December 1, and the Giacomini family has a water right for 0.5 cfs between April 1 and December 1.

After crossing under Sir Francis Drake Boulevard, the "Creek 2 or 1906 Drainage" channel crosses through the Lucchesi property and discharges into the West Pasture (Figure 27; Table 8). After flowing through a concrete box culvert, the creek makes a roughly 90 degree turn that funnels flow directly into the south end of the West Pasture freshwater marsh. As with Fish Hatchery Creek, the 1906 drainage requires near-annual maintenance to remove accumulated sediment and reduce flood hazards to adjacent properties. The chronic flooding at these properties is driven by channel infilling with granitic alluvium eroded from the Inverness Ridge with subsequent increase in water levels during storm events due to aggradation of the channel bed (KHE 2006a). Flooding impacts are discussed more under Public Health and Safety – Flooding. The 1906 Drainage flows into central southern portion of the marsh, after which it appears that flow largely follows topographic gradients into the depressional basin in the lower-elevation central and eastern portions of the marsh. This depressional basin has formed in response to higher elevations to the west (base of Inverness Ridge), east (West Pasture), and south (1906 Drainage alluvial fan).

The "Unnamed Drainage" has been observed flowing from a culvert in Sir Francis Drake Boulevard into a densely wooded riparian area on the east side of Sir Francis Drake Boulevard and then discharging into a remnant road-side drainage ditch (Figure 27). The water then flows north into Fish Hatchery Creek, just upstream of the north levee culverts. The subtle swale that constitutes this remnant roadside ditch appears to be the dominant water conveyance feature on the west side of the West Pasture freshwater marsh (KHE 2006a).

Another small drainage occurs in the southern portion of the West Pasture (Figure 27). This seasonal creek is also culverted underneath Sir Francis Drake Boulevard and has been ditched to connect with an existing low spot marked by a stand of arroyo willow (*Salix lasiolepis*) near the center of the pasture).

Interior Drainage Ditches and Remnant Slough Features. In the West Pasture, a small drainage appears at the southeastern corner of the Gradjanski property that flows eastward before turning north parallel to Sir Francis Drake Boulevard and eventually connecting with Fish Hatchery Creek near the north levee culvert. As was discussed earlier, this drainage, called the West Pasture Old Slough (Figure 27), appears to be the remnant of a historic tidal slough that has been ditched by the Giacomini family in its most upstream reaches to channel surface run-off from seasonal seeps or springs on the Gradjanski property. The southern portion of the Gradjanski property near this ditch is extremely marshy and appears to be wet for most of the year, although surface flows are only present in the most upstream portion of the slough for one to two months after spring rains end, typically drying up by March or April of each year (Parsons, *in prep*.).

The East Pasture contains a much more elaborate and extensive drainage ditch network to direct surface run-off and deliver and drain irrigation waters applied to the pastures (Figure 27). Historically, water was diverted from Lagunitas Creek near the upstream end of the East Pasture in the summer after installation of the earthen dam. Currently, the Giacominis are receiving irrigation waters from NMWD's Downey Well, with the waters being piped to the Ranch. Some of the drainage ditches in the East Pasture appear to be former slough channels that have been straightened, with the exception of the northern portion of the largest drainage channel, called the East Pasture Old Slough, which still retains a prominent relict meander. There are two discharge points for drainage ditch waters: a pump-house on the east bank of Lagunitas Creek and three 4-foot-diameter circular steel culverts equipped with one-way tidegates at the northern end of the East Pasture Old Slough. While relatively high salinities in the ponded area adjacent to the tidegates would suggest that these gates are leaky, floodwaters often pond in the northern portion of the East Pasture longer

than the West Pasture, which may indicate that these gates and the culvert are not effectively allowing waters to move out.

Irrigation waters are spray-irrigated in a large percentage of the northern portion of the East Pasture, with flood irrigation methods used for the southernmost pastures. Some pastures do not appear to be actively irrigated during the summer, probably because soil salinities are consistently high enough even with irrigation to preclude establishment and maintenance of pasture. In the past, the Giacominis used some of the drainage ditch waters to artificially flood the New Duck Pond and create conditions conducive to use by waterfowl. In addition to irrigation on the East Pasture, the standard dairy practice also includes spray irrigation of liquid waste from the manure ponds. The waste spraying occurs in the summer months within the East Pasture.

Groundwater

Tomales Bay. In addition to tidal and fluvial surface water, the other major hydrologic source to the Project Area is groundwater. According to Oberdorfer et al. (1990), groundwater flow accounts for less than 1 percent of the freshwater in the watershed, but it undeniably influences the hydrology and biology of this and other coastal California watersheds. Within the Tomales Bay watershed, groundwater substantially increases hydrologic complexity within wetland ecosystems by replacing the traditional upland to wetland cross-sectional transition common of most salt marsh systems with a freshwater to saltwater transition. Within many Tomales Bay subwatersheds, salt marshes are fringed with freshwater, brackish marsh, or riparian habitat due to the influence of seeps and springs along most of their perimeter (Parsons et al. 2004). Seeps and springs form the headwaters for many of the small drainages that flow to the Bay (Parsons et al. 2004).

The prevalence of these hydrologic sources within the Point Reyes area relates directly to the geologic complexity of this unstable region, with lateral and vertical movement along the San Andreas Fault fracturing basement rock and enabling underground aquifers to connect with the ground surface. However, certainly in more developed areas, groundwater and seep flow has probably been augmented to some degree by leaking septic systems, as many of the systems within Tomales Bay are antiquated and in need of repair or modernization (TBWC 2002).

East Pasture. Within the East Pasture, groundwater generally flows from south to north on a northwest gradient, largely following the northwest trend of the rift valley that probably imparts a strong parallel groundwater flow pattern similar to other fault-derived flow paths (KHE 2006a). In general, the groundwater gradient mimics the topography of the East Pasture, except in the very northern portion where the flatness of the pasture disconnects the groundwater table from surface topography (KHE 2006a). The lowest portion of the East Pasture is actually in the northeastern corner.

Groundwater was not included in the hydrodynamic model developed by KHE, however, groundwater depths were monitored regularly through shallow groundwater monitoring wells. These data show that a very shallow groundwater table exists throughout most or all of the year (KHE 2006a), with water depths being closer to the surface in the northern, lower elevation portions of the East Pasture. This groundwater table may originate from water-bearing alluvial deposits or layers within the Point Reyes Mesa (KHE 2006a), the adjacent coastal marine terrace formation that consists of non-marine and marine sand, gravel, silt and clay layers (Galloway, 1977; Clark and Brabb, 1997). Past development of small-scale groundwater wells for private use on the Point Reyes Mesa for residents has uncovered several water-bearing layers within this terrace, one of which is at approximately Mean Sea Level or roughly at the same elevation as the northern portion of the East Pasture (G. Ferrando, Point Reyes resident, *pers. comm*. *in* KHE 2006a). The depth of this groundwater table, as well as the potential for presence of an aquifer beneath the East Pasture, is constrained by the stratigraphy of the East Pasture, which is underlain by deep estuarine clays of low organic content, low permeability, and low groundwater storage capacity that act as aquitards or barriers to groundwater exchange (KHE 2006a). This factor strongly argues against the possibility of freshwater aquifer of any significant thickness, lateral extent, or storage capacity beneath the East Pasture (KHE 2006a).

Groundwater depths are not always consistent with the topography. The emergent of hillside springs or seep flow from the base of the Point Reyes Mesa contributes another layer of hydrologic complexity (Figure 27). These seeps and springs have promoted establishment of dense riparian scrub and marshy areas on the edges of the Mesa or even on its slopes, which are visible in 1942 photographs of the Project Area. The Giacominis have dredged ditches at the base of the Mesa in many areas to reduce flooding of pastures from groundwater. The source of these seeps and springs is undoubtedly one of the shallower water-bearing alluvial layers that

have been documented by groundwater well development in the Point Reyes Mesa terrace. Natural groundwater influences have probably been augmented to some degree by septic systems from the relatively densely populated developments on the top of the Point Reyes Mesa and, in some areas, by non-point source run-off from the town of Point Reyes Station. The relative contribution of septic influences to groundwater cannot be determined, but some limited water testing by the Seashore did detect Methlyene-Blue Active Substances (MBAS) in low concentrations at several locations around the perimeter: MBAS is a constituent of surfactant detergents and a fairly reliable indicator of septic or sewer influence (NPS, unpub. data). Interestingly, much of the West Pasture freshwater marsh appears almost to be completely tidal marsh in 1942, when this area was not diked, which potentially suggests that there has been a substantial increase in localized freshwater flow in this particular area of the West Pasture.

Some of the most evident seeps and springs in the East Pasture and vicinity occur on 1) the riparian habitat and seasonal wetland on eastern perimeter of Green Bridge County Park; 2) seasonally flooded pasture and riparian scrub on the southern slopes of the dairy mesa facility; and 3) seasonally flooded pasture, freshwater marsh ditch, and riparian-marsh scrub on the northern slope of the dairy mesa facility. The most and noticeable area with seeps and hillside springs is the section of the Point Reyes Mesa north of the Giacomini Hunt Lodge and south of Railroad Point. Surface run-off of hillside springs, combined potentially with groundwater emergence at its base, have not only created an extensive riparian scrub or Mesic Coastal Scrub community (see Vegetation Resources) on the face of the "bluff," as it is known, but appears to contribute to some degree to base flow within Tomasini Creek. Most importantly, groundwater inflow may buffer increased salinities within Tomasini Creek, which has become tidal again since failure of the tidegate, and thereby benefit the federally endangered tidewater goby, a brackish water species.

While the groundwater table underlying the Point Reyes Mesa would be considered "fresh," groundwater within the East and West Pastures is saline, with salinities ranging from 2 ppt (brackish) to as high as 40 ppt (hypersaline; NPS, unpub. data). Even the highest elevation area of the East Pasture that appears to be strongly influenced by groundwater from the Mesa had salinities as high as 5-6 ppt, which is brackish (NPS, unpub. data). Research conducted on the groundwater aquifers within the Point Reyes Station area have documented elevated chlorides, an indicator of salinity, in groundwater, even during the winter (Questa Engineering Corp. 2001: Affordable Housing). However, groundwater within the East Pasture displayed an ionic composition more characteristic of marine systems than that of the local aquifers or that would be expected from the presence of cattle and other agricultural practices such as manure spreading (NPS, unpub. data). Salts observed within groundwater, then, appear to be marine salts that were trapped within sediment during deposition prior to diking of the pastures (KHE 2006a). These salts are bound tightly to clay sediments and apparently leach into the groundwater table when it is contact with the clays. As noted earlier, early attempts by the Giacominis to use groundwater from two wells installed at the southeast portion of the East Pasture for irrigation failed due to poor water quality (SWRCB 1995).

As was noted earlier, limited portions of the East Pasture bordering Lagunitas Creek appear to have a hydraulic groundwater connection with the creek that causes shallow groundwater within these portions of the pasture to move up and down to some degree with tidal cycles (KHE 2006a). Although soils in these areas contain very porous coarse alluvium, there does not appear to be movement of water through the soils between undiked and diked areas, but rather that pressure from the tides creates a corresponding hydraulic pressure on the shallow groundwater table within the pasture (KHE 2006a).

West Pasture. Although limited monitoring was conducted in the West Pasture, as with the East Pasture, the general groundwater gradient in the West Pasture appears to run from south to north, again following the general topography and creating higher water levels within the very northern portions of the pasture. This groundwater gradient is overlain by the west to east groundwater gradient established by seeps, springs, and small drainages flowing off or emerging from the base of the Inverness Ridge (Figure 27).

The influence of seeps and springs is more pervasive along the West Pasture perimeter than the East Pasture one, as evidenced by the thin strip of arroyo willows that fringe the pasture along almost its entire length adjacent to Sir Francis Drake Boulevard. Flooding duration varies depending upon location along the perimeter, with some areas saturated to the soil surface for a brief time, while others are wet either permanently or seasonally throughout the winter and spring. There are at least four sizeable areas that are defined by groundwater influence. Two are south of the Gradjanski property and flood for an extended period during the winter and spring. The third occurs between the Gradjanski and Kostelic residences near Fish Hatchery and is flooded or saturated for an extended period. The fourth is the West Pasture freshwater marsh, which floods from groundwater as well as from creeks (1906 Drainage, Unnamed Drainage) and

occasionally tidal incursions. As with the creeks, groundwater flow to the marsh appears to be perennial, with much of the flow at least initially routed into an old drainage ditch alongside Sir Francis Drake Boulevard that has not been maintained for some time.

Stormwater Run-Off Sources for Project Area

Another source of hydrology for the Project Area is non-point source discharge run-off from adjacent communities and developments (Figure 27). The Project Area is bordered by two towns and at least three developed areas – Point Reyes Station, Levee Road, and Inverness Park. While some non-point discharge probably occurs from roadside run-off on Sir Francis Drake Boulevard and Levee Road flowing into the West Pasture and Olema Marsh, respectively, larger non-point source discharge occurs from at least three locations in the East Pasture and Tomasini Creek. One shallow ditch conveys run-off from the southern portion of the town through the Green Bridge County Park to a discharge location on Lagunitas Creek just upstream of the Giacomini Ranch. Another ditch conveys run-off from the central and western portions of town to the north-facing portion of the Dairy Mesa facility, where run-off flows down a vegetated swale into the Tomasini Triangle pasture at the eastern edge of the East Pasture. This ditch runs directly next to one of the unvegetated feedlots for young heifers or cattle run by the Giacomini Ranch and probably receives run-off from this lot during storm events. A third ditch parallels Mesa Road in a vacant lot west of the road and eventually joins with Tomasini Creek just after it flows underneath Mesa Road. Flow patterns for these discharges are unknown, but almost all of them are dry by summer, with the possible exception of the one at the Green Bridge County park, which has flow perennially. Groundwater flow from the bottom of the Point Reyes Mesa appears to be channeled into this ditch, as well, possibly explaining the extension of flows beyond the winter and spring rainy season.

Water Resources – Floodplains

As noted earlier, one of the more important hydrologic functions that wetlands and streams play is floodwater retention and dissipation of flood flow energy. This function results from the ability of creeks and bays to be able to move onto their floodplains during periods of high water. Many of these floodplains are vegetated, which helps to slow down flood waters, as well, by a providing a source of "roughness" or resistance. This dissipation of flood flow energy and retention of floodwaters not only benefits humans, but wildlife. This section specifically addresses hydrologic processes related to flooding and access to floodplains within the Project Area. Detailed information on flooding and floodwater retention capabilities of floodplains related to human safety and protection of property is discussed later in this chapter.

For optimal performance of these functions, wetlands and streams should be physically connected to their floodplains and have an intact riparian corridor. The largest creek within the Project Area is Lagunitas Creek, whose floodplains represent almost the entire 550-acre Giacomini Ranch property. As noted earlier, Lagunitas Creek has been subject to a number of hydrologic alterations that could affect flooding. Construction of five dams in the upper watershed has undoubtedly altered flood flow structure. Typically, dams reduce the frequency and duration of instantaneous peak flows, while increasing the duration of bankfull or ordinary high water flows (Fenner et al. 1985, Stromberg and Patten 1990, Johnson 1992, 1994, 1998, Friedman et al. 1998). Within the Lagunitas Creek watershed, the dams are operated specifically for water supply. Except for the mandated flow releases (SWRCB Decision 95-17), the reservoirs are operated to fill, and then spill. In general this means that drainage area during earlier events is limited to the undammed portions of the watershed. Once the reservoirs are full, they pass peak flows through. The effect of the dams on flooding is specifically tied to the timing of the storm event. If the event occurs early in the season, when reservoirs are filling, flooding would be dramatically reduced. If the event occurs after the reservoirs are full, the dams would not change flooding scenarios. In all cases, however, the dams do change the pattern of sediment supply and transport through the watershed. During dry years, the dams reduce the overall level of downstream flooding through increased reservoir retention of flood flows.

In the Project Area, Lagunitas Creek has been disconnected from its floodplains by the 8- to 17-foot levees that have been constructed along its perimeter, which has created a strongly to moderately entrenched creek along this reach and reduces the ability of the creek to connect with its floodplain. During 2-year flood events -- or floods of a magnitude that occur, on average, every 2 years or some recurrence interval greater than that – levees are high enough to preclude the East Pasture from being flooded by Lagunitas Creek. Hydraulic modeling results show that, during 2-year flood events, inundation area totals only 2 acres, and standing water volume totals only 2 acre-feet, most of which comes probably from precipitation and surface run-off

(KHE 2006a). Flood recurrence was modeled using extreme flooding conditions, combining both high flood flows and extreme tides (6.0 feet) such as occurred during the 1982 flood (KHE 2006a). In the West Pasture, inundated area (76 acres) and standing water volumes (62 acre-feet) are larger than the East Pasture even under conditions when levees are not overtopped by Lagunitas Creek (<12.5 year flood event), because of surface flows from Fish Hatchery Creek and other small drainages (KHE 2006a). In Olema Marsh, standing inundation volume totals 202 acre-feet during a 2-year event, with most of that water coming from Bear Valley Creek, because poor hydraulic connectivity and the large standing water volume in the marsh greatly reduce the potential of Olema Marsh to provide off-channel floodwater storage for Lagunitas Creek (KHE 2006a).

During 2-year flood events, then, almost all of Lagunitas Creek flood flows remain in the channel, greatly increasing flood stage or the vertical height of flood flows. Hydraulic modeling suggests that, under a 2-year event, peak flood flows in the Project Area could reach as high as 8.2 feet, because of the lack of floodplain storage (KHE 2006a). The cumulative volume of water that could move through the Project Area in Lagunitas Creek under a 2-year event totals approximately 437.8 million cubic feet of water based on hydraulic modeling estimates (KHE 2006a). The lack of floodplain storage not only increases the stage and volume of water in Lagunitas Creek under 2-year events, but exacerbates the erosion potential of flooding, because floodplains dissipate the erosive energy of flood flows. Streamside riparian vegetation can reduce flood flow energy, but 60 to 70 years of levee maintenance has limited the amount of riparian growth, at least along the Giacomini Ranch levees.

One of the more important hydrologic functions that wetlands and streams play is floodwater retention and dissipation of flood flow energy. This function results from the ability of creeks and bays to be able to move onto their floodplains during periods of high water.

Despite levees, overbank flooding does periodically occur (KHE 2006a). Hydraulic modeling indicates that the East Pasture creek bank upstream of White House Pool near the old summer dam location is overtopped by approximately a 3.5-year flood or greater (KHE 2006a). During 5-year flood events, inundated area and standing water volume increases greatly, with acreage increasing from 2 to 249 acres and standing water volume increases from 2 to 611 acre-feet (KHE 2006a). Under successively larger flood flows, inundation area steadily increases, with standing water volume increasing to 2,818 acre-feet in the East Pasture and 450 acre-feet in the West Pasture during a 100-year flood event or flood with a similar magnitude to the 1982 event (KHE 2006a). Comparatively, standing water volume in the 66 acres of Olema Marsh that are inundated during a 100-year flood event averages approximately 544 acre-feet (KHE 2006a). During 100-year events, flood stage or vertical height of flood flows in Lagunitas Creek is only slightly higher (~ 12.5 feet) than under a 2-year event (8.2 feet), because flood flows are being shunted into the East and West Pastures, thereby relieving flood pressure in the creek itself (KHE 2006a). Based on computer simulations, water levels could reach as high as 13.1 feet in the East Pasture and 9.8 feet in the West Pasture during 100-year flood events (KHE 2006a). From modeling 100-year flows, it is apparent that the West Pasture can absorb only a fraction of the floodwaters that move through the East Pasture (~3.2 percent) and Lagunitas Creek (~1.4 percent; KHE 2006a).

During flood events such as these in which overtopping occurs, water levels within Lagunitas Creek build in vertical height or stage until they exceed the height of the levees, at which point they overtop and flood into the East and West Pastures. Once waters flow into the leveed pastures, the pastures fill rapidly to a maximum standing water volume, where floodwater persists for some time as they slowly drain through the only outlets, which are the concrete spillway and tidegate/culvert (West Pasture only). The southern portions of the East and West Pasture drain quickly, but, during larger storms, floodwaters can remain ponded within the northern portions of the pastures for more than a week, because elevations are lower in these areas than the concrete spillways.

The Levee Road Lagunitas Creek bank floods, on average, during 3-year or greater flood flows (KHE 2006a). While the difference may not seem dramatic, the section of the East Pasture that was modeled is one of the lower elevations areas along the south bank (10-11 feet). Upstream of this location, the levee resumes, and

the crest height is 14- to 17-feet, with overbank flood recurrence intervals correspondingly increasing in this area to between 50- and 100-year storm events (KHE 2006a). These results suggest that the height of the Giacomini Ranch East Pasture levee and creek bank effectively places higher flood pressure on Levee Road and the 15- to 20 homes built along the creek's edge (KHE 2006a).

Downstream of White House Pool, flood frequency drops, probably because the creek widens, thereby decreasing stage height or height of flood flows relative to the narrow creek section upstream of White House Pool for floods with the same frequency. While the East Pasture levee downstream of the cattle crossing location is lower in elevation than the one near the old summer dam, flood flows only overtop the levee in this area during a 7-year event (KHE 2006a). The West Pasture levee is also lower in elevation than the East Pasture one, ranging from only 10- to 12-feet high, and, yet, the West Pasture is only flooded by Lagunitas Creek when flood events are quite large (≥12.5-year flood recurrence interval; KHE 2006a).

Lagunitas Creek's floodplains overlap considerably with those of the two other primary tributaries to the pastures – Fish Hatchery and Tomasini Creeks. With the exception of some limited dredging, Fish Hatchery Creek is a very shallow system with relatively intact floodplains. Floodplains are defined by the higher elevation perimeters of the West Pasture along its western and eastern edges. Conversely, Tomasini Creek has been entirely disconnected from its floodplain through construction of a berm. No information is available on how often this creek might overtop its berm, which varies in height near the Giacomini Hunt Lodge from 8 to 12 feet NAVD88, but overtopping events were not observed during 2001-2005. In late 2005-2006, a winter storm-extreme high tide event in January estimated as an approximately 30-year event appears to have breached and overtopped the berms and caused some erosion near the Giacomini Hunt Lodge. According to the Giacominis, the section of levee near the Giacomini Hunt Lodge is the most susceptible to erosion and breaching by Tomasini Creek (KHE 2006a). Currently, Tomasini Creek's active floodplain is restricted to the small floodplain terrace benches on either side of the creek, one of which is the historic railroad grade. Historically, floodplains for this meandering creek probably encompassed a relatively large portion of the East Pasture.

Floodplains for the other creeks and drainages in the West Pasture are relatively small, with the possible exception of the 1906 Drainage, which has a very narrow, confined floodplain through and just downstream of the Lucchesi property until it flows into the West Pasture freshwater marsh. The 1906 Drainage is excavated annually just downstream of the Lucchesi residence for flood minimization purposes.

Floodplains for the lower portion of Bear Valley Creek are defined by Bear Valley Road, which runs along its eastern perimeter, and the elevated floodplain terrace created from deposition of granitic alluvium on its western perimeter. The lower reach of the creek has no defined channel planform or "bed and bank," thereby allowing flood flows to spread across a moderately wide section of the floodplain. Downstream of Bear Valley Road, the creek flows into Olema Marsh, with most of the flows hugging the eastern perimeter. However, the lack of a well defined channel and bank within this section enables the creek to use a large portion of the marsh as a floodplain.

Water Resources - Sediment Transport Dynamics

One of the most important processes for bays and creeks involves movement of sediment from upstream source watersheds to downstream water bodies, such as Tomales Bay or even the Pacific Ocean. This process of moving sediment does not take place instantaneously, but rather over a longer period of time, with large and small-grained material such as gravel, sands, silts, and clays being moved incrementally downstream during different storm events. Through this process, the shape or geomorphology of creek channels is formed. Once sediment finally reaches tidally influenced downstream water bodies, a new type of transport process takes place. Sands from the ocean and river-borne sediments, particularly fines, are continually resuspended by tides and redistributed within estuaries, helping to build sandbars, mudflats, and fringing marshes.

Fluvial or Creek-Dominated Processes

While large flooding events are often accompanied by huge inputs of sediment to downstream water bodies, more frequently occurring flood events, even as frequent as annual or ordinary high water flows, usually move more sediment and have a greater influence on channel shape (Leopold 1994). Reaches of channel tend to go through periods where they either accrete or lose more sediment, however, over time, the aggradation and

erosional processes remain in balance in undisturbed natural systems. Should natural catastrophic events change sediment loads, the system will move toward what might be called a new dynamic equilibrium state, ultimately coming to balance sediment inputs and outputs, although the channel may assume a new form or shape.

Anthropogenic disturbances can create discontinuities in the sediment transport process that can tilt the equilibrium scale towards either net aggradation or erosion and radically change the shape or form of the channel. Dams can drastically decrease the amount of sediment or gravel available for downstream recruitment. Areas in which no sediment movement or aggradation is occurring often have what is called "armored" or hardened gravel bars, signifying that material is not depositing or moving downstream. Conversely, areas in which the equilibrium is tilted toward aggradation often have conversion of subtidal or unvegetated intertidal habitats to vegetated ones. One of the most vivid examples of this is the conversion of southern Tomales Bay from a low-energy subtidal and low intertidal system primarily shaped by redistribution of fine-grained clays and silts from Tomales Bay to a fluvial-dominated deltaic system composed of large-grained sands, small gravel, and fines. The massive influx of sediment due to logging and other disturbances associated with development of the upstream watershed tilted the sediment equation from transport to aggradation, with rapid expansion of the intertidal delta into Tomales Bay. It has been estimated that the peak sedimentation period between 1860s and 1910 resulted in deposition of almost 5 vertical feet of sediment (PWA et al. 1993) and 250 -300 acres of new intertidal marsh in very southern portion of Tomales Bay, principally the Giacomini Ranch and area directly north of the Ranch.

During storm events, creeks are moving large or coarse-grained sediment (cobble, gravel, sand, and even boulders), as well as fine sediment (clays, silt, finer sands). Much of the coarse-grained material is deposited within the channels in gravel bars or immediately adjacent to the channel, sometimes forming alluvial or natural levees along the creek channel. Fine sediment typically deposits further from the stream channel through overbank flooding onto floodplains, although changes in channel morphology such as a sudden flattening of the creek gradient or slope, substantial widening of the creek channel, or transition from creek to a large open water body such as a bay can cause fine sediment to deposit within the stream channel itself. Gravel bars are depositional features within creek channels; on floodplains, sediment transport in creeks often manifests as alluvial fans or very large, rounded hills that occur in areas where there are sharp transitions between steep slopes and flat floodplains.

Within many alluvial or classic riverine systems, certain discharge or flow events are believed to perform the most work over the long-term in terms of sediment transport (Wolman and Miller 1960). The dominant discharge is often linked to intermediate streamflow or discharge events, which correspond to "bankfull flow" or flood events that occur every 1- 3 years or very 1.5- 2 years on average. However, there are systems in which the dominant discharge appears to be the largest flood on record such as the Santa Clara River (Stillwater Sciences 2005).

Estuarine Sediment Transport Processes

Within bays and estuaries, sediment is stored within mudflats, sand bars, and shoals or shallows. Storage within estuaries represents a very dynamic process, with frequent remobilization of sediments, particularly fines, from these storage "reservoirs" through resuspension by tides, storms, and wind mixing. These sediments are redistributed to marshplains, mudflats, and channels of the bay or even eventually exported to the ocean. Most of this sediment comes from the surrounding watershed, but sand moved by longshore sediment transport along the Point Reyes coast also moves into the bay to be redistributed by wind-generated waves (PWA 2005). As discussed earlier, construction of dams within the watershed appears to have dramatically reduced watershed sediment contributions to Tomales Bay (Rooney and Smith 1999), increasing the importance of resuspension to sedimentation patterns within Tomales Bay. Construction of dams in the Sacramento-San Joaquin watershed has also dramatically reduced the Central Valley contribution to the San Francisco Bay sediment budget, potentially accounting for large erosional losses in shallow areas in San Pablo and Suisun Bays observed between 1942 and 1990 (Jaffe et al. 1996, 2001 in McKee et al. 2002).

Estuarine circulation patterns largely dictate the pattern of sediment deposition within estuaries, particularly deposition of suspended or fine sediments. As with fluvial sediment transport processes, bathymetry and currents can exert tremendous influence on where suspended is resuspended and where it is deposited. However, estuarine areas are unique in that sediment transport and deposition processes can also be influenced by salinity. Bathymetry, currents, and salinity, either in combination or separately, appear to drive formation of concentrated zones of sediment deposition, which have been referred to as Estuarine Turbidity

Maximum (ETM). During recent decades, extensive research has been conducted into this phenomenon, because of its implications for aquatic organism diversity and trapping of sediments, nutrients, and contaminants (Peterson et al. 1975; Arthur and Ball 1979; Kimmerer et al. 1998; Columbia River Estuary Turbidity Maxima (CRETM) 2001). Classically, ETM was linked to the Null Zone observed in transitional regions of estuaries with classic estuarine or gravitational circulation (e.g., strong stratification of fresh and tidal flows) near the landward boundary of tidal influence, which often occurs around 2 ppt (Postma and Kalle 1955; Festa and Hansen 1976; Festa and Hansen 1978); Peterson et al. 1975 *in* Kimmerer 2004). In these zones, sediment resuspended by strong tidal currents moving along the channel bottom and sediments carried by river or creek flow converge and are trapped by the upward moving current created by stratification at the landward extent of tidal influence, greatly increasing water turbidity and eventual sediment deposition on the channel bottom.

In recent years, physical controls other than the Null Zone have been linked to ETM, including abrupt changes in bathymetry or shoaling (Schoellhammer 2001), ebb and flood tidal currents in river mouths (Ganju et al. 2004), and redistribution of dissolved and particulate fractions in intermediate rather than low salinity reaches (Rasheed 1997). In addition to the effect that salinity has on stratification of estuarine waters and longitudinal gradients and currents, salinity can also play a direct role in determining patterns of sediment deposition through flocculation or aggregation of river-borne sediment particles caused by the increased electrostatic charge present at the landward edge of the "salt wedge" (Arthur and Ball 1979).

Sediment Transport Dynamics within Tomales Bay

For the Bay as a whole, the trend towards net aggradation continues, although construction of dams apparently caused deposition rates to drop substantially after the 1950s (TBWC 2002). Comparisons were made between 1861 and 1994 using hydrographic charts with corrections made for changing sea levels (Rooney and Smith 1999). These calculations showed a bay-wide average infilling rate of 0.2 inches/year, which is equivalent to a watershed erosion rate of approximately 80,000 tons per year (Rooney and Smith 1999).

Between 1861 and 1931, sedimentation accumulation rates within Tomales Bay averaged 94 tons per square kilometer per year, increasing to 357 tons per square kilometer per year between 1931 and 1957 and decreasing to 101 tons per square kilometer per year between 1957 and 1994 (Rooney and Smith 1999). These sedimentation patterns contrast somewhat with findings from the PWA et al. (1993) study of southern Tomales Bay and delta expansion, which pointed to the 1861-1931 period as having the highest sedimentation rates. Rooney and Smith (1999) note, however, that sediment yield in the Bay is not necessarily synonymous with erosion and that there can be "decades long delay between maximum level of soil surface disruption and maximum sediment deposition." During these decades, sediment is typically stored in streambeds, gradually moving towards the Bay through episodic resuspension during storms. Another storage reservoir for sediment is stream deltas such as Lagunitas Creek: "A similar delay was found between initial deposition of sediment at stream deltas and subsequent redistribution other areas of the Bay more geographically remote from deltas" (Rooney and Smith 1999).

While watershed sediment contribution has decreased in the last 50 years, Tomales Bay continues to become shallower through sediment inputs. In addition, colonization – or re-colonization – by native Pacific cordgrass (*Spartina foliosa*) appears to be causing a conversion in some areas of shallow intertidal mudflat to vegetated marsh. The present sedimentation rate in the bay, based on both bathymetric changes since 1957 and sediment yield measurements, has been about 0.04 to 0.08 inches/year (Smith and Hollibaugh 1998).

The dynamics of Null Zones or ETM have not been specifically investigated on a system-wide basis in Tomales Bay, but ETM may exist at the mouth of Lagunitas, Walker, and other tributaries to Tomales Bay that undoubtedly has many of the same benefits for biota documented in San Francisco Bay. The three-dimensional models developed recently for Tomales Bay would be invaluable in evaluating transport and depositional processes such as Null Zones and ETMs throughout the system, particularly as it could strongly bear on the fate of suspended sediment and associated nutrients, pathogens, and contaminants.

Sediment Transport Dynamics within the Project Area

Lagunitas Creek. Construction during the 1950s of the five dams within the Lagunitas Creek watershed, which controls 70 percent of the runoff for this subwatershed, has obviously greatly affected sediment dynamics within this system. MMWD studies conducted in 1979-1980 concluded that total suspended

sediment delivery from Lagunitas Creek to the Project Area and vicinity averaged 34,300 tons per water year and 2,140 tons per water year of bedload or coarse sediment as calculated at the Point Reyes stream gage (H. Esmaili and Associates 1980). Annual bedload and suspended sediment transport totals actually decreased at the Point Reyes stream gage relative to the reach immediately upstream at the old Tocaloma Bridge, suggesting that increased channel storage or bank deposition was occurring in what was then – and probably still is now -- an aggrading reach or portion of the stream (H. Esmaili & Associates 1980). Many low-gradient or flatter reaches of creeks in coastal California undergo periods of net deposition during periods of high run-off followed by removal or net erosion during normal run-off conditions (H. Esmaili & Associates 1980). While the subwatershed of its largest tributary, Olema Creek, is less than a fifth the size of Lagunitas, Olema contributed significantly more suspended and bedload sediment to Tomales Bay -- 68,300 tons and 20,800 tons per year, respectively (H. Esmaili & Associates 1980). Higher sediment transport rates for Olema Creek were attributed to possibly climatic change, grazing, or other land use factors (H. Esmaili & Associates 1980), while work conducted in the late 1980s (Questa Engineering 1990) also identified differences in geology and the fact that Olema Creek flows along the active San Andreas Fault Zone.

While sediment transport generally increases with stream discharge or the size of the flood event, some streams have a diminishing rate of increasing suspended sediment transport at higher flows (Leopold 1994, Esmaili & Associates 1980). As noted earlier, more frequently occurring floods known as the "dominant discharge," that occur even as frequently as annually or during ordinary high water flows, usually move more sediment and have a greater influence on channel shape (Leopold 1994). Sediment studies conducted by H. Esmaili & Associates (1980) in 1979-1980 suggested that the rate of sediment transport in the lower sections of Lagunitas Creek just upstream of the Project Area begins to decrease during relatively small flood events (~1-year flood event), but that sediment load continues to increase through at least approximately the 7.5-year flood event and probably greater. Stream rating curves developed for Lagunitas Creek at the Point Reyes gage based on 1979-1980 data suggest that, at least during the early 1980s, a 2-year flood event with flow of 3,515 cfs would move a considerable amount of suspended sediment -- approximately 10,000 tons per day – but substantially less bedload material, only 170 tons per day (H. Esmaili & Associates 1980). None of the suspended material would have been deposited on floodplains because of the levees and/or lack of hydrologic connectivity.

While sediment transport patterns appear to have changed substantially in Olema Creek since the parks purchased portions of the watershed, land use factors affecting sedimentation rates in Lagunitas Creek would not appear to have changed substantially since construction of the dams in the 1950s. Within the Lagunitas Creek watershed, the dams would appear to exert the most control over sedimentation rates and patterns. Because dams tightly regulate some of the smaller flood flow events and their sediment loads, the highest rates of sedimentation in this subwatershed may now come with catastrophic flooding just as is seen currently in the Santa Clara River (PWA et al. 1993, Stillwater Sciences 2005). The 1982 flood caused deposition of 160 acre-feet of sediment on the Lagunitas and Walker Creek alluvial deltas (Anima et al. 1983 *in* PWA et al. 1993). The 1979-1980 study, however, demonstrates that there are still substantial sediment contributions from unregulated tributaries and their watersheds, even with the dams (H. Esmaili & Associates 1980). Current trends in the upper portions of the Lagunitas Creek watershed have not been formally studied, but several researchers have reported problems with "fining" or excessive deposition of fine sediments such as clays and silts relative to coarse materials such as gravel and cobble; poor sediment recruitment below the dams; and armoring of smaller gravel and fine sediments (Stillwater Sciences 2004).

To determine current trends in sediment transport processes within the Project Area, KHE sampled gravel bars in Lagunitas Creek between the Green Bridge and north of the Giacomini Ranch's north levees (KHE 2006a). As described earlier, there are several prominent gravel bars within the Project Area, including one downstream of the Green Bridge, one near the cattle-crossing location midway through the Project Area, and one just south of the north levees. Results show that grain-size distributions for the Green Bridge and north levee bars are very similar and are dominated by fine-grained gravel (KHE 2006a). The cattle crossing gravel bar is composed of coarse-grained gravel (KHE 2006a). Field observations of the creek between the north levee and Tomales Bay also indicate a relatively coarse-grained, firm bed, grading from fine-grained gravel at the north levee to medium- to coarse-grained sand at the deltaic outfall to Tomales Bay (KHE 2006a). The coarse-grained nature of these surficial bed deposits indicates that Lagunitas Creek possesses a relatively high sediment transport capacity through the Project Area (KHE 2006a).

Conclusions made from grain-size distribution are supported by modeling results that indicate creek flows are sufficient to mobilize and transport coarse-grained materials observed within the Project Area (KHE 2006a) despite flattening of the creek gradient or slope. As might be expected based on channel geomorphology, the

narrow, confined reach upstream of White House Pool and downstream of the Green Bridge tends to transport fines, as well as coarse sand and fine gravel, although stream energy is not high enough to convey coarse gravel and cobble (KHE 2006a). Downstream of White House Pool at the cattle-crossing "gravel bar," stream power drops slightly where the creek widens, and there is some loss of transport, but relatively little (KHE 2006a). Transport rates generally increase again downstream of the cattle crossing bar through the north levee (KHE 2006a).

Based on stratigraphy, fine or suspended sediment appear to be deposited within adjacent floodplains when flows are sufficient to crest the levees (KHE 2006a). One of the highest depositional areas in the East Pasture appears to be the southwestern corner opposite White House Pool, where the Giacominis apparently deliberately removed or lowered levees to preferentially direct flooding (KHE 2006a), perhaps because of repeated flooding problems in the past during more frequently occurring flood events (~ 3 to 5 years). The 1942 aerial photograph shot just prior to establishment of the Giacomini Ranch and following an average winter without excessive flood scour or sedimentation clearly shows overbank scour and sediment deposits within the southeast portion of the East Pasture, along Lagunitas Creek, and within the West Pasture, from historic overbank flooding events (KHE 2006a). For overbank flooding events, sediment transport rates are highest just at the point of entry near the south levee of the East Pasture, with flow velocity dropping sharply throughout the remainder of the pasture (KHE 2006a). Modeled flow velocity in the south is high enough to transport coarse sand and fine gravel, which, then, based on modeling results, would be deposited in the southern-most fields, which appears to agree with information from sediment coring and aerial photographs (KHE 2006a). Sediment transport in the northern portion of the East Pasture is hindered by persistent ponding of floodwaters caused by reduced outflow, which is limited by the concrete spillway and culvert capacity. In the West Pasture, flow velocity during highly infrequent overbank flooding events (> 12 years on average) does not appear sufficient to transport sediment through the pasture, with most sediment probably deposited immediately on the floodplain after cresting the levee (KHE 2006a).

While the upstream reach of Lagunitas Creek does have the highest and perhaps most intrusive levee system, from historic maps, it appears that this section of creek was naturally somewhat narrow and confined, at least during recent recorded time. Therefore, the levees may not have changed fluvial sediment transport processes substantially in the reach upstream of White House Pool relative to "natural" conditions. The other potential impediment, Green Bridge, which almost completely spans the active floodplain of the creek, also does not appear to be having a substantial negative impact on transport processes (KHE 2006a), although the presence of the gravel bar directly downstream again may attest to some effect of the bridge on sediment deposition patterns.

Unlike San Francisco Bay, not much is known within Tomales Bay or the Project Area about estuarine sediment transport processes. Within the Project Area, Lagunitas Creek is well-mixed and fresh, usually well below 2 ppt, during the period of highest freshwater flows and contaminant contribution. If the classic Null Zone were to occur during the winter and early spring, it would be at some point in Tomales Bay itself, where channels are deep enough – and tidal currents are strong enough – to create gravitational circulation and strongly stratified conditions despite the high volume of freshwater flow. Based on longitudinal salinity gradients, gravitational circulation does exist upstream of White House Pool, but only very briefly in the late spring and early to mid-summer, when sediment, nutrient, and contaminant loads are much lower. Typically, ETM are generated through a combination of sediments that are resuspended by strong tidal currents and that are being carried in suspension by river and creek flows. Based on hydraulic modeling results, the strength of tidal currents is not sufficient within the portion of Lagunitas Creek in the Project Area to mobilize even fine sediments except for directly downstream of the cattle crossing gravel bar (KHE 2006a), however, the full complexity of stratified estuarine circulation and associated transport processes may not be captured by a one-dimensional model that is vertically or depth-averaged. ETM may also develop within the Project Area based on other physical forces such as flocculation of creek-borne sediment and organic material induced by increased salinity within waters (Arthur and Ball 1979) or bathymetrically controlled changes in creek circulation and sediment transport patterns due to shoaling at the two gravel bars downstream of White House Pool. While estuarine sediment transport processes have not been as well studied in this watershed as fluvial ones, these processes also have strong implications not only for patterns of sediment deposition in the Project Area, but the potential for the Project Area to improve water quality conditions within southern Tomales Bay by trapping suspended sediment that may be bound to nutrients, bacteria, or other contaminants.

Fish Hatchery Creek. Fluvial transport processes were not specifically modeled, but historical information on past flooding events indicates that flow velocities decrease appreciably once the creek gradient begins to flatten at the base of the Inverness Ridge, creating excessive deposition or debris flow even during relatively mild storm events. During storms, substantial amounts of loose, granitic material from the Inverness Ridge

mobilizes and moves down to the valley below, with anecdotal reports suggesting that as much as 10- 12 feet of sediment may have deposited along the base of the Inverness Ridge as a result of extensive debris flows. Over longer periods, these repeated mobilizations of sediment manifest as large alluvial fans on which most of the adjacent homes are constructed. Alluvial fans also occur along the West Pasture perimeter where other Inverness Ridge creeks flow into the West Pasture, including the 1906 drainage. Based on the extent of past excavation, the depositional zone probably extends just downstream of where Fish Hatchery Creek makes a 90 degree turn to flow northward towards the north levee. Tidal current velocities are only high enough near the north levee to move sediment under average and extreme conditions, although extreme tides may be capable of moving silt and fine sand downstream of the levee in the undiked portion of Fish Hatchery Creek (KHE 2006a).

Bear Valley Creek and Olema Marsh. Similar to Lagunitas Creek, the history of Bear Valley Creek is one also marked by discontinuities in the sediment transport, this time, due to infrastructure and creek maintenance activities. As described earlier, Bear Valley Creek has been subjected to a variety of disturbances, including damming; road and berm construction within and across its floodplain; culvert installation; natural and anthropogenic fill in the active floodplain and terraces; channel realignment for construction of the Park Service maintenance facility; and dredging to decrease flooding of the Park Service administrative headquarters. All these disturbances have served to disrupt the sediment transport equilibrium within the creek and Olema Marsh. As was noted earlier, during the 1960s-1970s, the middle section of Bear Valley Creek was incised, meaning that the depth from the top of channel bank to the channel bottom was pretty deep, measuring roughly 6 to 8 feet (KHE 2006b). The incision showed that the channel was out of equilibrium, with sediment loss greatly exceeding sediment gain.

After the 1982 flood, Bear Valley Creek underwent some very dramatic changes as a result of catastrophic debris flows from the Inverness Ridge (USGS 1982). Debris flows originating in the two major tributaries of Bear Valley Creek carried into the mainstem of Bear Valley Creek, choking the former channel and turning the colluvial valley bottom into a sandy, braided stream channel with extensive woody debris jams that acted to temporary dam and pond waters within the channel. In essence, the natural event reshaped Bear Valley Creek, converting at least the middle reach from a net erosional to a net depositional system.

Dynamics of this system are complicated, however. While sedimentation did increase after the 1982 flood, it appears, based on sediment borings conducted by KHE, that much of this sediment is not moving from the middle reach of Bear Valley Creek into the lower and Olema Marsh portions (G. Kamman, KHE, *pers. comm*.). As discussed earlier, sediment borings in these areas point to increases in elevation being from accumulation of peat or undecomposed organic matter, rather than sediment. Sediment within Bear Valley Creek may be trapped upstream in the reach that has been dredged historically (G. Kamman, KHE, pers. comm.). Modeling results suggest that, if sediments were capable of reaching Olema Marsh, that it would be a depositional environment because of the reduction in flow velocities (KHE 2006a). Under extreme flooding, flow velocities might be high enough for transport of silt and fine sands, but these would drop out of suspension mid-way through Olema Marsh (KHE 2006a). In the case of both floods and tides, which are limited in extent in Olema Marsh, conveyance of sediment would appear to be highest at the Levee Road culvert, where funneling of flows through a narrow constriction tends to increase stream power and velocity (KHE 2006a).

Hydrologic Processes and Wetland Functionality

Some of the most important functions played by wetlands relate directly to the presence and condition of hydrologic processes, including components linked to hydraulics, geomorphology, and hydrodynamics of fluvial or stream and tidal systems. These functions include dissipation of flood flow energy, retention of floodwaters, water quality improvement, carbon export, and wildlife habitat use and support. Streams that are able to connect with functioning, vegetated floodplains can buffer humans and wildlife from impacts associated with flooding and poor upstream water quality. In addition, these same areas support wildlife not only by providing habitat and food within streams and floodplains, but by exporting food and organisms downstream to larger water bodies. The ability of systems to provide hydrologic functions such as these decreases when streams are leveed or become too deep (incised) and are not able to connect with their floodplains. In addition, development of floodplains for commercial, residential, and, to some extent, agricultural purposes also reduces wetland functionality.

Lagunitas and Tomasini Creeks are leveed, although topographic surveys suggest that they are not incised or that the bottom elevation of channels has not deepened through erosion. As discussed earlier, depending on

the exact reach within the Project Area, Lagunitas Creek still connects within its floodplains in the Giacomini Ranch for flood flows that occur, on average, between 3.5 years to 12 years, with flooding in the upstream portions probably exceeding 50 years (KHE 2006a). However, they are not flooded under the most frequently occurring flows, those with a recurrence interval ≤ 2 years, which often correspond to some of the important flows from a geomorphic perspective in terms of channel creation and maintenance, sediment transport, etc. There are no flooding recurrence estimates for Tomasini Creek, but, according to the Giacominis, Tomasini Creek overtops the levee near the Giacomini Hunt Lodge during some of the larger storm events (KHE 2006a). Fish Hatchery Creek has not been leveed within the Giacomini Ranch West Pasture and is well-connected to its floodplains, although the Giacominis occasionally deepen the channel through sediment removal. Rapid aggradation of Bear Valley Creek since the 1982 flood has resulted in reconnection of lower Bear Valley Creek with its floodplains, including in Olema Marsh. Flooding in relation to adjacent private residences and county roads will be discussed in more detail under Public Health and Safety.

Some of the riparian vegetation along the southern portion of Lagunitas Creek adjacent to the Giacomini Ranch – where vegetation would be expected to naturally occur – has been removed and/or precluded from establishing by placement of riprap, although quite a few stands remain, particularly on the lower portions of the bank. In fact, approximately 75 percent of Lagunitas Creek banks with potential to support riparian habitat are vegetated with riparian species despite past levee maintenance efforts. This vegetation increases the ability of this section of creek to dissipate flood flows. Riparian loss along Tomasini and Fish Hatchery Creeks is much more extensive, with approximately 40 percent and 25 percent of the Tomasini and Fish Hatchery creek banks, respectively, supporting riparian vegetation where it would be expected to naturally occur. Historic riparian loss apparently occurred along Bear Valley Creek when it was actively ranched, but, since ranching ceased, riparian vegetation has rapidly recolonized, although increases in water levels within the lower portion of the creek, including the marsh, appear to be drowning some of the mature riparian trees.

Not only do levees keep waters out, thereby decreasing floodwater retention capability, they also keep any waters that do occur such as from precipitation, run-off, or groundwater inside the levees, thereby decreasing the potential for exporting carbon and other food sources to downstream water bodies. Water quality monitoring indicates that dissolved organic carbon within drainage ditches, ditched sloughs, and creeks is relatively high, but this carbon source is unavailable to organisms in Tomales Bay, because waters are trapped within the pastures by the levees (Parsons, *in prep*.). To a lesser extent, export of carbon produced within Olema Marsh is also minimized by the poor hydraulic connectivity between the marsh and Lagunitas Creek (Parsons*, in prep*.).

Loss of floodplain connectivity for more frequent flood flows such as floods occurring every one to two years not only decreases the ability of the Project Area to store floodwaters, but also to improve the quality of downstream waters. Floodwaters carrying nutrients, sediment, pathogens, and other contaminants from upstream portions of the watershed flow onto floodplains, where plants and even topography act to slow down waters and cause these contaminants to drop out of suspension onto the floodplain. Most of these nutrients and contaminants are chemically bound to suspended or fine sediment in flood flows. Once deposited onto floodplains, nutrients can be uptaken by plants or used by bacteria or retained within sediments for potential release at later periods. Metals and organic contaminants are often effectively "locked" into anaerobic wetlands soils for extended periods of time and only released if wetland conditions drastically change, which is why wetlands are often used for treatment or polishing of wastewater. Changes in stream gradient, stream channel width, or shoals or gravel bars can also encourage deposition of suspended or fine sediment within channels, as well as floodplains. Based on field investigations and hydraulic modeling results, widening of the creek just downstream of White House Pool reduces streamflow velocity – and power – enough to create and maintain the bar composed primarily of coarse gravels at the cattle crossing location, probably during larger flood events. This feature may then influence deposition of slightly finer materials such as coarse sand and fine gravel downstream of the gravel bar during lesser flood events by acting as a shoal.

In addition to overbank flooding or in-channel deposition of suspended sediment during flood events, wetlands and aquatic systems can also trap contaminants through estuarine sediment transport processes such as ETM established by Null Zones or other hydrodynamic or circulation-related forces. The interaction between salt and freshwater in transitional zones such as the Project Area can create zones of high turbidity and potential sediment deposition through development of upward moving water currents or Null Zones or flocculation of sediment and organic material when freshwater encounters saltwater, which has a higher electrostatic charge. These estuarine sediment transport processes combine with fluvial ones to increase the complexity of sediment transport and deposition dynamics within transitional zones. The processes controlling estuarine sediment transport and deposition in Tomales Bay have not been specifically studied, but it is highly probable

that ETM occur within the Bay and even the Project Area and that these ETM would have strong implications potentially for water quality improvement and aquatic biota.

Water Resources – Water Salinity and Water Quality

One of the most important functions that wetlands play is the improvement of water quality, which may be that much of the wetland protection regulations relate to water quality. Wetlands improve water quality through trapping of sediments, nutrients, and contaminants, which are either retained or transformed in soils or uptaken by plants. The value of wetlands for water quality improvement has encouraged many municipalities to develop treatment wetlands specifically for at least polishing and refining of treated wastewater.

Water Salinity

Regulatory and Policy Setting

Salinity is typically not a regulated parameter of water "quality," but within certain regions, salinity can be a concern. Discharge of agricultural waters and run-off can increase concentrations of agricultural "salts" (i.e., conductivity or conductance) within downstream water bodies, which can affect aquatic biota. Conversely, increases in duration and volume of freshwater inflow from releases of treated wastewater can change salinity dynamics within estuaries, converting saltwater wetlands to freshwater ones. Large acreages of wetlands within south San Francisco Bay have shifted from being saltwater wetlands to brackish or even freshwater ones because of large volumes of year-round treated wastewater release. The RWQCB has attempted to stop this trend by requiring many sewage treatment plants to store treated or re-use wastewater during the summer to ensure that salinity dynamics of the estuary do not continue to be altered. In the 1995 Basin Plan, the RWQCB states that, "controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat."

Regional and Tomales Bay Setting

Salinities within Tomales Bay are dictated largely by the degree of tidal and freshwater influence, although other factors can affect salinities and salinity structure such as estuarine geomorphology, current, evaporation, bathymetry, wind, and other hydrodynamic processes. As was described earlier, previous studies and recent three-dimensional hydrodynamic modeling of Tomales Bay showed that different circulation patterns occur in the outer, inner, and even middle portions of the Bay, which greatly affect salinity conditions (Largier et al. 1997a, 1997b; Harcourt-Baldwin 2003; Gross and Stacey 2003). Near the mouth, strong tidal currents and a channel-shoal structure consistently maintain ocean water salinities, although salinities may briefly be reduced periods of heavy freshwater inflow (Hollibaugh et al. 1988, Harcourt-Baldwin 2003, Gross and Stacey 2003). In contrast, salinities in the middle and inner bays are highly variable, both temporally and spatially. Throughout the year, waters in the middle and inner portions of Tomales Bay vary from well-mixed and nearly fresh after heavy winter runoff to strongly or partially stratified during spring and early summer and potentially even slightly hypersaline in late summer (Hollibaugh et al. 1988, Harcourt-Baldwin 2003, Gross and Stacey 2003) depending on natural variation in summer flows, as well as mandatory and non-mandatory releases from watershed reservoirs. This seasonal variability is accentuated by spatial variability, with numerous large and small creeks and perhaps even groundwater discharge points leading to multiple saltwater-freshwater interfaces along the Bay's perimeter.

These physical interfaces between freshwater and saltwater result in creation of a very dynamic portion of estuarine systems – the transitional zone between saltwater and freshwater. Based on freshwater inflow, the Project Area represents the largest transitional zone within Tomales Bay. Unlike salt marshes in marine-dominated systems, where salinities remain relatively constant throughout and between years, salinities change dramatically both within and between years in these transitional zones in response to seasonal and annual changes in freshwater flow. These seasonal and annual changes in salinity within transitional zones can exert a tremendous influence on ecosystem dynamics by radically altering the diversity and types of organisms present, as well as influencing localized and downstream water quality conditions through sediment deposition and resuspension. Long term changes in freshwater flow related to decadal trends in climate or

anthropogenic disturbances such as increases in freshwater flow diversion or increased freshwater flow during the summer can even alter the composition of vegetation communities. One of the largest transitional zones in the San Francisco Bay region is Suisun Bay in the San Francisco Bay – Sacramento Delta estuary.

Salinities within most transitional estuarine zones vary markedly throughout the season, ranging from freshwater conditions (0.2 to 0.5 ppt) in the winter and spring to saline or euhaline (30-40 ppt) conditions in summer. Salinity conditions are not only determined by the volume and duration of freshwater flow, but by circulation patterns driven by physical forces such as tides, density and temperature gradients, wind, bathymetry, and even evaporation. In "classic" estuaries, longitudinal density gradients related to salinity typically result in stratification of waters, often during the spring and/or summer, with freshwater flows creating a lens of less dense freshwater or brackish water on the water surface and tides driving a wedge of denser, saltier water upstream on the channel bottom. During the rainy season, depending on the volume of freshwater flows, tidal influence can be minimized or even eliminated, resulting in a uniformly fresh water column. In the summer and fall, particularly in systems where freshwater flows cease or decrease substantially, water salinity -- and structure of salinity within the water -- can be determined more by the degree of tidal influence, tidal cycle, vertical mixing induced by winds, tidal currents, or bathymetry, and temperature-related evaporation, leading to either salinity-stratified or well-mixed brackish, saline, or even hypersaline conditions that can vary depending on month, tidal cycle, or water depth (Kimmerer 2004, Schoellhamer 2001).

One of the most well-studied components of transitional zones in San Francisco Bay is the Low-Salinity Zone or X2. The LSZ or X2 refers to a hydrologic zone or geographically variable portion of the estuary with salinities of approximately 2 psu (~2 ppt), which has been used in San Francisco Bay as an index of the physical response of estuary to freshwater flow and the effect of freshwater diversions in the Central Valley (Kimmerer 2004). In San Francisco Bay-Sacramento Delta Estuary, investigations into the LSZ and target organism abundance have found significant relationships, at least some of the time, for estuarine-dependent copepods, mysids (*Neomysis mercedis*), bay shrimp (*Crangon franciscorum*), and several fish including longfin smelt (*Spirinchus thaleichthys*), Pacific herring (*Clupea pallasii*), starry flounder (*Platichthys stellatus*), Sacramento splittail (*Pogonichthys macrolepidotus*), American shad (*Alosa sapidissima*), and striped bass (*Morone saxatilis*; Kimmerer 2004). The timescale over which salinity changes can also have a profound effect on estuarine organisms, with gradual changes or stable conditions more beneficial for many species than abrupt changes or fluctuating salinity (Kimmerer 2004). The relationship between salinity and biota is discussed more under Fish and Wildlife Resources. As discussed under Water Resources – Sediment Transport processes, salinity can also affect transport and depositional patterns of suspended sediments through creation of Estuarine Turbidity Maximum (ETM) or zones of increased suspended sediment concentration and deposition to a number of physical processes or properties, including gravitational or classic estuarine circulation, bathymetry, geomorphology, tidal cycles, and flocculation of river-borne sediments and organic material due to increased electrostatic charge of saltwaters (Arthur and Ball 1979, Schoellhamer 2001, Ganju et al. 2004, Kimmerer 2004) .

Lagunitas Creek. The portion of Lagunitas Creek in the Project Area represents a unique component of estuaries – the dynamic interface zone between saltwater and freshwater influences that results in highly variable season and interannual salinity conditions. The Lagunitas Creek delta is one of the largest estuarine transition zones in Tomales Bay and is analogous to the Suisun-lower Sacramento Delta region of San Francisco Bay. Salinity concentrations and structure within Lagunitas Creek appear to be dependent on bathymetry and strongly driven by the natural seasonality of freshwater inflow, corresponding height and range of tides, and deviations from natural intraannual and interannual patterns in freshwater inflow due to reservoir releases (Parsons, *in prep*.).

In the winter (December – April), very uniform freshwater conditions (< 1 ppt) can persist in upstream areas until June, when strong stratification starts to occur with as much as 16 ppt difference in salinities in surface and bottom waters (NPS, unpub. data). Summer freshwater inflow is maintained at minimum levels during both average (8 cfs) and dry (6 cfs) years due to releases from reservoirs mandated by the SWRCB (95-17), which may affect not only overall water salinity, but salinity structure in the Project Area. In the late fall, surface salinities once reached as high as 14 ppt near the Green Bridge, but salinities are typically much lower (< 5 ppt). Salinities decrease appreciably upstream of the Green Bridge during the summer and fall, with conditions often fresh (<0.5 ppt), except during higher high tides when salinities increase after a short time lag to approximately between 1 and 3 ppt (KHE and NPS, unpub. data). Midway through the Project Area, salinity ranged from 0.1 ppt in the winter to 20 ppt in the summer. At the northern end of the Project Area, fresh to slightly brackish conditions (0.1 ppt) are present typically only during the months with rain, with

salinities climbing rapidly to 20 to 30 ppt starting in early summer. Results of the hydrodynamic model agreed reasonably well with actual salinities from monitoring data, although the model is a one-dimensional system that averages salinity conditions across depth (KHE 2006a). Within the Project Area, the section of creek upstream of White House Pool is deep enough to become strongly stratified during at least some portion of the year, due, in part, to the water impounding effect of the gravel bar at the cattle-crossing location (Parsons, *in prep*.). Downstream of this gravel bar, the creek widens and becomes shallower, and salinity structure within this reach is usually only partially stratified or even well-mixed (Parsons, *in prep*.).

Some data from 2003 exemplifies this conclusion (NPS, unpub. data, Parsons, *in prep*.). During the rainy season, salinities were uniformly low (0.1 ppt), both within the water column and Project Area. Starting in May, salinities remained low and uniform (0.1 -0.5) in the Project Area, except for the north levee, where salinities increased to approximately 5 ppt. During the June sampling date, salinities increased above freshwater conditions everywhere except at the Green Bridge, but there was only slight stratification within the White House "Pool" (e.g., 0.9 to 1.3 and 2.5 to 2.8). During July, salinities became highly stratified at least within the "Pool," with surface salinities at 3.7 and bottom salinities of 21.6 at White House Pool proper, probably because freshwater inflow, as regulated by reservoir releases, was relatively strong. In August and succeeding fall months, the degree of stratification upstream of White House Pool decreased or even disappeared at times and appeared to become more dependent on an interaction between freshwater flows and tidal cycle. From August through December 2003, the LSZ, represented by bottom salinities of 2 ppt, entirely disappeared from this section of Lagunitas Creek.

The influence of bathymetry on salinity concentration and structure is not only apparent from the stratification within the "Pool," but the fact that, occasionally, higher salinity waters appear to pool between the cattle-crossing location and north levee gravel bars, creating a saltwater "pool" in the midst of the Project Area (Parsons, *in prep.*). In October and November 2003, higher salinity waters ranging around 28 ppt were observed midway through the Project Area, while waters downstream at the north levee ranged from 21 to 24 ppt (NPS, unpub. data). Hydraulic modeling results point to the cattle crossing gravel bar have a significant effect on salinities within the creek: if the gravel bar were not present, maximum salinities within the creek upstream of White House Pool could increase by as much as 35 percent (KHE 2006a).

Salinity and salinity structure is also governed by the pattern of freshwater inflows, particularly during the summer and fall months. In unregulated systems within Mediterranean climate systems, salinities might increase steadily in response to natural hydrologic patterns of steady decreases in freshwater inflow superimposed over small-scale daily variations in evaporation and evapotranspiration. Diurnal variations in flow from evaporation or evapotranspiration associated with vegetation represented as much as 10 percent of the mean stream discharge for the Merced River, with rate dependent on total vegetation cover and ambient temperatures (Lundquist and Cayan 2002). However, in regulated systems such as Lagunitas Creek, salinity structure may also be influenced by daily variation in reservoir releases, as well as pumping or withdrawal rates for wells and other stream diversions (Parsons, *in prep*.). Randomly selected average daily discharge data from the USGS Point Reyes Station gage shows some interesting small-scale variations in freshwater inflows during the summer of 2001 and 2002 (Figure 29). This

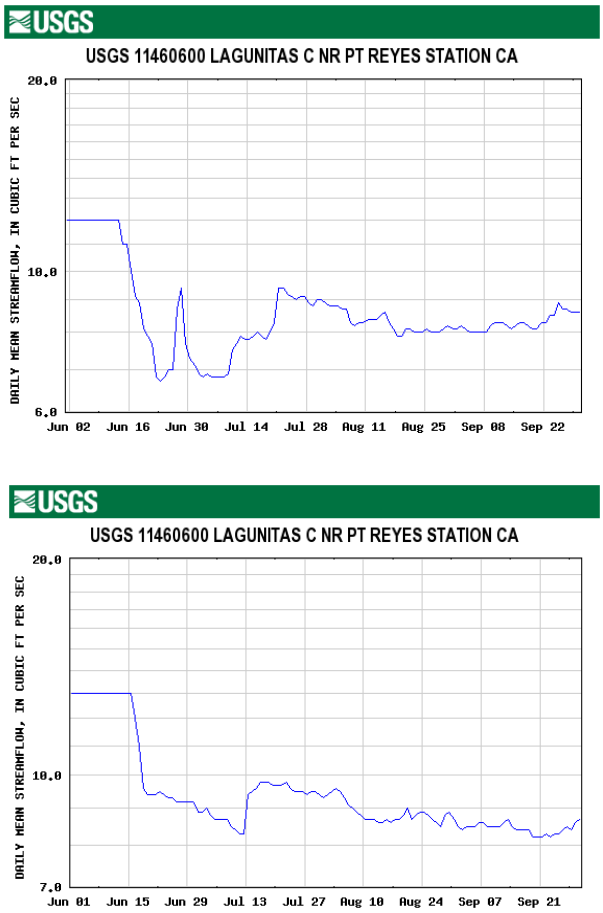


Figure 29. Daily Average Flow, June 1- September 30, 2001 (upper)
Daily Average Flow, June 1 - September 30, 2002 (lower)

gage is far enough upstream that it is not subject to tidal influence, except during extreme events (G. Kamman, KHE, *pers. comm*.). For example in 2001, stream discharge dropped from 12 cfs to 6.75 cfs within approximately 9 days, followed by a sharp, temporary increase from 7.0 cfs to ~9.4 cfs over the period of one to two days (Figure 29). In summer 2002, stream discharge dropped from 13 cfs to 9.5 cfs over 1 to 2 days, followed later by a sharp increase by approximately 2 cfs over another 1 to 2 days (Figure 29). Whether natural or unnatural, fluctuations in freshwater inflow, particularly sharp ones, as shown in Figure 29, would have substantial effects on salinity patterns, both within stratified and mixed portions of the creek (Parsons, *in prep*.). Modeling results for Lagunitas Creek suggest that changes in stream discharge of 2.0 cfs can result in increases in doubling or 100 percent increases in maximum water salinities (KHE 2006a).

Tomasini and Fish Hatchery Creeks. Similarly, as freshwater flow in Fish Hatchery and Tomasini Creeks decreases, salt "wedges" move up the creeks, although the upper portions of at least Tomasini Creek often go dry during the summer and early fall months. Salinity concentrations within Tomasini Creek varied between a maximum of 27-ppt during the summer and 0.1-ppt during the winter (KHE 2006a). The movement of the salt wedge upstream during the summer results in brackish water conditions (~18 – 22 ppt) occurring near the Giacomini Hunt Lodge (KHE 2006a). Perennial fresh water conditions exist at the confluence of Tomasini Creek and Mesa Road. At Fish Hatchery Creek, salinity ranges from perennial fresh waters at the furthest upstream location near Sir Francis Drake Boulevard, progressing toward more saline and seasonally variable waters downstream in the West Pasture (Parsons, *in prep*.). By late summer, freshwater flows have decreased enough to allow the salt wedge to move midway through the West Pasture across from the Lucchesi-Kostelic residence. Salinities of the West Pasture Old Slough tributary are consistently higher than those of Fish Hatchery Creek, probably due to the more seasonal nature of the freshwater inflow. At the West Pasture Old Slough, salinities range from 0.1- to 5 ppt in the winter and 20- to 30 ppt in the summer. During the summer and fall, salinities at the north levee and in the undiked portion of Fish Hatchery Creek are closer to euhaline, ranging from 20 to 30 ppt.

Based on data from 2003, salinity patterns and structure are similar to Lagunitas Creek in that stratification only occurs within certain reaches of Tomasini and Fish Hatchery Creeks during specific seasons, with occurrence dependent on the interaction between freshwater inflow and tides (Parsons, *in prep*.). The water column shows uniform or partially stratified salinities throughout the creeks through June. Strong stratification occurs at deeper sections of the creeks – the central portion of Fish Hatchery and the section of Tomasini south of the Giacomini Hunt Lodge – July and/or August due to the persistence of at least moderate freshwater inflows. Stratification within these deeper sections disappears or is reduced during the early fall in response to decreased freshwater inflow and shallower water depths, resulting in more mixed conditions. Stratification is reestablished in deeper sections during some of the early winter storms, (e.g., 0.4 at the surface and 24.1 at the bottom at Fish Hatchery Creek in November 2003), with conditions turning uniformly fresh once rainfall is persistent.

Giacomini Ranch East Pasture. Areas such as the East Pasture that is not directly influenced by tides and creeks show seasonal patterns and stratification in salinities, as well, although the patterns are somewhat reversed (Parsons, *in prep*.). During the summer and fall 2003-2004, salinities within the drainage ditches and East Pasture Old Slough remain relatively low (~0.2 to 0.8) probably due to pumping of irrigation water into the ditch and slough system. However, during the months of January through March, salinities within the ditch and Old Slough actually increase to between 1.5 to as high as 9.4, with stratification of fresh and saltwater occurring in some of the relatively deep sections. Irrigation appears to drive down salts during the summer months. Starting in April or May, salinities decrease again and remain low until the following January. The only exception to this is the very northern end of the East Pasture Old Slough, which, despite being cut off from Lagunitas Creek by a dike and one-way flapgate, shows more typical patterns in salinities, with salinities increasing through the summer and fall and dropping during the winter. Areas such as the shallowly flooded vegetated flat near the Point Reyes Mesa and the New Duck Pond are seasonally flooded, with salinities averaging approximately 4 and 1 ppt, respectively. Only the drainage ditch in the Tomasini Triangle at the base of the north-facing Dairy Facility Mesa slope showed consistently fresh- to very low brackish salinities, with salinities never exceeding 0.6 and averaging 0.2 ppt.

As discussed earlier, the source of salts for surface waters within diked portions of the East Pasture appear to result from persistence of residual marine salts deposited when the areas were not diked (KHE 2006a). In addition, the northeastern portion of the East Pasture is being affected by tidal inflows from Tomasini Creek that are being routed through a culvert in the levee into the drainage ditch and shallowly vegetated flat used by waterfowl and shorebirds (Parsons, *in prep*.). Salinity of groundwater was consistently higher throughout the year than that of surface waters, probably due to the limited infiltration of irrigation waters and direct

contact with soil horizons containing high concentrations of residual salts. Groundwater salinities were quite variable in the northern and central portions of the East Pasture, ranging from 6 to 40 ppt during the three years of monitoring (NPS, unpub. data). Salinities in the southern portion of the East Pasture, which represents the highest elevations, ranged from only 2- to 5 ppt, probably due to the minimal influence of tides historically at the base of the alluvial fan and the presence of significant groundwater seep and spring flow from the Mesa (NPS, unpub. data). Groundwater salinities in the Tomasini Triangle in the far eastern portion of the East Pasture surprisingly ranged as high as 5- to 9 ppt (NPS, unpub. data). Based on modeling, topography, and historic maps, this area appears to have once been part of an alluvial fan or plain at the mouth of Tomasini Creek and, at least based on current topography, would be above the influence of almost all tides (KHE 2006a). However, data suggests that extreme tides probably once reached this area.

Giacomini Ranch West Pasture and Freshwater Marsh. The West Pasture is not as heavily ditched as the East Pasture, because it is not irrigated. However, it is more heavily influenced by small drainages and groundwater seeps from the Inverness Ridge. These hydrologic sources have generally created a freshwater to saltwater gradient from west to east, as well as from south to north (Parsons, *in prep*.). Northern portions of the West Pasture appear to be saltier due to overbank flooding of limited tidal action through the north levee modified tidegate and groundwater interaction with residual salts in the soil (See East Pasture discussion above). Salinities in the northern portion of the West Pasture along its western perimeter are consistently low due to the strong seasonal to perennial influence of groundwater.

One exception to this salinity gradient occurs within the West Pasture freshwater marsh. Long-term salinities within this marsh prior to 2003 are unknown, but some spot sampling in a few areas associated with amphibian surveys found salinities during the winter that ranged from 0.1 ppt to 0.8 ppt (Fellers and Guscio 2002). Interestingly, while vegetation composition pointed to the marsh largely being "fresh," salts were detected in the groundwater (NPS, unpub. data). Salinities in shallow groundwater wells within the marsh ranged from 0.3 to 4.4 during late fall 2002 and early 2003 (NPS, unpub. data). This is suggestive of a historic source of salts within the soils, probably to tidal influence prior to diking. Based on the 1862 U.S. Coast Survey map, the West Pasture freshwater marsh was almost completely subtidal or unvegetated intertidal habitat with just a thin fringe of land apparent on the western perimeter. Salts from tidal influence during this period have probably remained in the peaty clay soils despite diking and a conversion from marine or brackish to predominantly freshwater conditions.

In winter 2003, the West Pasture freshwater marsh experienced much higher salinities due to collapse of the culverts at the north levee, which appeared to increase the range of tides allowed into the West Pasture and the freshwater marsh. Based on changes in the vegetation, it appeared that this change in tidal range was dramatically affecting salinities within the marsh (NPS staff, pers. obs.). Monitoring of salinities within the surface waters in July and August 2003 showed that salinities increased to as high as 6 - 35 ppt within this marsh, although groundwater seepage and flow from drainages appear to maintain a freshwater lens of less than 1 ppt at the western perimeter of the marsh or on the water surface (NPS, unpub. data, KHE, unpub. data). Following repair of the tidegate, tidal amplitude within the West Pasture was compressed, limiting the range of tides to between 3.4 and 5.25 ft NAVD88, the latter of which appeared to be the height at which saltwater incursion into the freshwater marsh occurs (KHE 2006a). Tidal events triggering water levels of 5.25 feet NAVD88 appear to only occur when water levels within undiked areas exceeds 6.25 to 6.5 feet NAVD88 (KHE 2006a), which are at the higher end of high tides and relatively infrequent.

Culvert and tidegate repair appears to have reduced the extent and duration of salinity intrusion events in the marsh. However, salinity intrusion events still occur. Based on some continuous water quality monitoring in 2004, salinities in the marsh appear to be highest between December and March, despite increased freshwater flow from rainfall (Parsons, *in prep*.). This counter-intuitive pattern – salinities would typically be expected to be highest during the summer – appears to be related to annual trends in extreme high tides, which are at their highest during this period (>7 feet MLLW). In mid-January 2004, high tides exceeding 6.2 ft MLLW occurred within Tomales Bay, thereby probably triggering a salinity intrusion event. In March 2004, salinities in the marsh ranged from as high as 4.68 to 8.13 ppt, averaging 4.2 and 7.4 ppt, in the deepest and shallowest portions of the marsh, respectively (NPS, unpub. data). Over the next two months, salinities dropped to an average of 2.53 ppt in April 2004 and 1.6 ppt in May 2004, and subsequent monthly spot sampling in the summer showed that salinities remained at these levels throughout the summer (NPS, unpub. data). This water salinity pattern suggests that saltwater intrusion events occur principally in the winter and that the volume of saltwater is high enough to create saline conditions despite very high freshwater inflows from creeks, drainages, and groundwater (Parsons, *in prep*.). In addition, the extended period over which salinities dropped points to long residence time for saltwaters, probably because the highly vegetated and

depressional basin structure of the marsh discourages exchange or draining to nearby Fish Hatchery Creek (Parsons, *in prep*.).

Saltwater intrusion events do not necessarily affect the entire West Pasture freshwater marsh. Within the marsh, tidal flows appear to move up the western perimeter of the marsh near Sir Francis Drake Boulevard and then disperse over the marshplain into lowest, deepest portions of the marsh in its center (Parsons, *in prep*.). Based on long-term salinity monitoring, it appears that saltwater intrusion occurs exclusively in the northern and central portions of the marsh, representing approximately two-thirds or 5.3 acres of the marsh. A rise in topographic gradient associated with the base of the Inverness Ridge to the west and the alluvial fan of the 1906 Drainage to the south appears to minimize salinity intrusion in the southern one-third (1.9 acres) of the marsh, particularly in combination with perennial freshwater flows from the 1906 Drainage. Salinities in the 1906 Drainage never exceed 0.1 ppt (NPS, unpub. data).

Water Quality

Perhaps, one of the most important functions that wetlands can provide in Tomales Bay is water quality improvement. While Tomales Bay is often considered a relatively pristine estuary, it is still vulnerable to anthropogenic impacts. As was described under Soil Resources, the Bay is subject to impacts from agricultural activities, leaking septic systems and landfills, past mercury mining, boating and boat facilities, offshore oil spills, and potentially even atmospheric deposition of contaminants from more heavily urbanized watersheds. During the last few decades, poor water quality has forced oyster fisheries to close down several times and, in 1998, was associated with a virus outbreak. In 1994, Tomales Bay was listed as threatened under the state's Shellfish Protection Act. Mercury mining during the late 1960s-1970s eventually resulted in deposition of mercury-contaminated sediment into Tomales Bay. Because of mercury problems, fish consumption advisories were established in 2000 and reissued in 2004 for Bay species such as jacksmelt (*Atherinopsis californiensis*), California halibut (*Paralichthys californicus*), and leopard shark (*Triakis semifasciata*; California EPA Fish Consumption Advisories web page; Advisory No. 400404).

The failure of Tomales Bay to consistently meet water quality standards for designated beneficial uses such as oyster mariculture, public recreation, and wildlife needs prompted the RWQCB to designate it as impaired under Section 303(d) of the Clean Water Act. These water quality problems have galvanized public and private efforts to improve water quality through both source reduction and restoration. The Park Service is actively working with community and local government groups on a number of projects related to water quality, the largest of which is the Giacomini Wetland Restoration Project. The Park Service's commitment to improving watershed health is evidenced by incorporation of a watershed-based restoration goal that encourages project proponents to search for opportunities to improve conditions within the entire Tomales Bay watershed, not just the Project Area. The Park Service believes that reestablishing the hydrologic connection between the Bay and this historic salt marsh could play a vital role in improving water quality not only within the Project Area, but within Tomales Bay by retaining and/or transforming sediment, nutrients, and pathogens in floodwaters. Two-thirds of the Bay's freshwater inflow – and therefore potential sources of pollutants -- comes from the Lagunitas and Olema Creeks, which flow through the Project Area (Fischer et al. 1996).

As with sediment contaminants, excessive inputs of nutrients can convert wetlands from a sink to a source. The Giacomini Ranch has operated since the 1940s, but another dairy existed within a portion of the Giacomini Ranch area prior to that. Agricultural operations such as dairies, in which cattle are highly concentrated in both pastures and barn facilities, can increase loading of nutrients and potentially pathogens from manure. Because of concerns that restoration could result in at least a temporary increase in nutrient loading into Tomales Bay should the Ranch have very high concentrations of manure in the pastures, the Park Service implemented monthly to quarterly systematic sampling of field parameters, nutrients (nitrate, nitrites, total ammonia, total dissolved phosphates), chlorophyll a/phaeophytin, and pathogen indicators (total and fecal coliform) within the Project Area and selected reference sites in spring 2002. This sampling program would be continued as part of a long-term monitoring program for the proposed project.

Regulatory and Policy Setting

Increasing concern about polluted waters in the 1960s led to a number of federal and state efforts to improve water quality, some of which led to increasing protection for wetlands, which were recognized for their important role in improving water quality.

The most well-known legislation protecting the nation's waters is the Federal Water Pollution Control Act (Clean Water Act) and subsequent amendments of 1977 (33 USC §1251 et seq.). The Clean Water Act provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters, primarily through three sections – Section 404, Section 401, and Section 303(d). Section 404 (33 U.S.C. 1344) of the Act prohibits the discharge of fill material into navigable waters, tributaries to navigable waters, and special aquatic sites of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (the Corps) and U.S. Environmental Protection Agency. Under Section 401 (33 U.S.C. 1341), states and tribes can review and approve, condition, or deny all Federal permits or licenses that might result in a discharge to state or tribal waters, including wetlands. In California, authority for Section 401 has been delegated to the State Water Resources Control Board (SWRCB), which shares its authority with nine regional boards (see Porter-Cologne Act below).

The Clean Water Act was actually predated by California's Porter-Cologne Water Quality Act of 1969 (California Water Code, Division 7, §13000), the principal California law governing water quality control in California. The Porter-Cologne Act applies broadly to all State waters, including surface waters, wetlands, and ground water; it covers waste discharges to land as well as to surface and groundwater, and applies to both point and non-point sources of pollution. SWRCB is the lead agency for enforcement and provides for establishment of waste discharge requirements for discharge to the state's surface and groundwater resources. SWRCB shares authority for implementation of the Clean Water Act and the Porter-Cologne Act with regional water boards. Each RWQCB governs one of the nine hydrologic regions into which California is divided, adopting regional water quality control plans (basin plans) for their respective regions. Waste discharge requirements for San Francisco Bay are outlined in the *Water Quality Control Plan for the San Francisco Bay Basin* (RWQCB 1995a). Water quality control plans designate beneficial uses of water for specific water bodies, establish narrative or numerical water quality objectives to protect those uses, and provide a program to implement the objectives. For Lagunitas Creek, beneficial uses include contact and non-contact recreation, oyster production, municipal and domestic water supply, agricultural supply, cold freshwater habitat, fish migration, preservation of rare and endangered species, recreation, fish, spawning, and wildlife habitat. For certain water quality objectives such as total and fecal coliform, specific numeric criteria have been developed for different beneficial use types. A list of the most relevant water quality objectives is provided in Table 9. These numeric criteria often specify a maximum or minimum or one-time "not to exceed" concentration or range of values, but also include measures of central tendency such as average or median concentrations (the central or middle value) over specified periods of time.

Should water bodies violate water quality objectives for its beneficial uses, the state is authorized under Section 303(d) of the Clean Water Act to declare these areas as "impaired" or unable to perform designated beneficial uses by specified contaminants. Both Lagunitas Creek and Tomales Bay have been declared impaired under Section 303(d) for excessive sedimentation and high levels of nutrients and pathogens. Tomales Bay has also been listed for mercury. In recent years, the RWQCB has been changing its primary focus from regulating point source discharges only to managing point and non-point source pollutant loads within entire systems or water bodies through setting Total Maximum Daily Load (TMDL) standards. The RWQCB has finalized the Tomales Bay Pathogen Total Maximum Daily Load (TMDL) standard and will be establishing TMDL standards for mercury, sediment, and nutrients over the next five years for Tomales Bay, Lagunitas Creek, and Walker Creek (http://www.waterboards.ca.gov/ sanfranciscobay/tmdlmain.htm). A nutrient TMDL has also been planned, but a schedule for this was not available.

In addition to protection afforded by the Clean Water Act and related state legislation, there are other protections for water quality. The Gulf of the Farallones National Marine Sanctuary shoreward boundary follows the mean high tide line of Tomales Bay. The Farallones prohibits or otherwise regulates activities related to discharging or depositing any material or matter, constructing structures, drilling through the seabed, dredging or altering the seabed, or removing or damaging any historical or cultural resource (15 CFR, Chapter IX, Subpart H). The Park Service Management Policies (2006) support federal and state efforts to either preserve or improve water quality. Parks are required to "determine the quality of park surface and ground water resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks" (Section 4.6.3; NPS 2006). Furthermore, parks are mandated to "take all necessary actions to maintain or restore the quality of surface waters and groundwaters consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations" (Section 4.6.3; NPS 2006). Marin County regulates activities that substantially degrade surface or groundwater quality through CEQA review, as well as through grading and stormwater permits. It has established several-water related policies, including reduction of pathogen, sediment, and nutrient (WR-2.2), avoidance of erosion and sedimentation (WR-2.3), and protection of watersheds and aquifer recharge (WR-1.1; CWP 2005). The Point Reyes Station Community Plan

TABLE 9. SELECTED WATER QUALITY OBJECTIVES UNDER THE SAN FRANCISCO BASIN PLAN

BACTERIA[a]	**Beneficial Use or Habitat/Location**	**Fecal Coliform (MPN/100ml)**	**Total Coliform (MPN/100ml)**
Basin Plan	Water Contact Recreation	• Geometric mean<200 • 90th Percentile <400	• Median < 240 No sample > 10,000
	Shellfish Harvesting[b]	• Median < 14 • 90th Percentile <43	• Median < 70 • 90th Percentile <230[c]
	Non-contact Water Recreation[d]	• Mean < 2000 • 90th percentile < 4000	
	Municipal Supply/ Surface[e]	• Geometric mean < 20	• Geometric mean < 100
Tomales Bay Pathogen TMDL	Tomales Bay	• Median < 14 • 90th percentile < 43	
	Lagunitas Creek, Olema Creek, and Walker Creek	• Log mean <200 • 90th Percentile <400	
TMDL Load Allocation	*Lagunitas Creek at Green Bridge*	• Log mean < 95	
DISSOLVED OXYGEN	**Habitat/Location**	**Numerical Min. Objective**	**Numerical Median Objective**
	Tidal Waters *Bay Delta*	5.0 mg/l Minimum 7.0 mg/L minimum	
	Non-Tidal Waters *Cold Warm*	7.0 mg/L minimum 5.0 mg/L minimum	Median D.O. for any three consecutive months not < 80 percent.
PH	**Habitat/Location**	**Acceptable Range**	**Numerical Change Objectives**
	All	6.5-8.5	Controllable water quality factors not cause changes > 0.5 units in ambient pH.
SALINITY	**Habitat/Location**	**Narrative Objective/Numerical Change Objectives**	
	All	Controllable water quality factors not increase the total dissolved solids or salinity of waters so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.	
SEDIMENT	All	• Suspended sediment load and suspended sediment discharge rate not be altered in such a manner to cause nuisance or adversely affect beneficial uses. • Controllable water quality factors not cause a detrimental increase in concentrations of toxic pollutants in sediments or aquatic life.	
TEMPERATURE	Inland Waters – Cold and Warm Habitats	• Natural receiving water temperature not altered unless demonstrated that alteration does not adversely affect uses. • The temperature of any cold or warm freshwater habitat not > 5°F above natural temperature.	
TURBIDITY	All	Waters free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases relatable to waste discharge not > 10 percent in areas where natural turbidity is > 50 NTU.	
UNIONIZED AMMONIA	**Habitat/Location**	**Numerical Objectives**	
	All	Annual Median ≤ 0.025	
	Central Bay/Delta	Maximum ≤ 0.16 mg/L	
	Lower Bay	Maximum ≤ 0.4 mg/L	

Notes:
a. Based on a minimum of five consecutive samples equally spaced over a 30-day period.
b. Source: National Shellfish Sanitation Program.
c. Based on a five-tube decimal dilution test or 300 MPN/100 ml when a three-tube decimal dilution test is used.
d. Source: Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, 1968.
e. Source: DOHS recommendation.

Table Source: RWQCB 1995a

(Marin County Community Development Agency 2001) identifies protection of Lagunitas Creek, including its water quality, as an objective.

Nutrients and Other Parameters

Tomales Bay. Tomales Bay has been subjected to intensive study on water quality, bay water mixing and nutrient dynamics through the National Science Foundation, Land Margin Ecosystem Research (LMER) program (Kimmerer et al. 1993; Chambers et al. 1994; Joye and Hollibaugh 1995; Smith et al. 1996; Largier et al. 1997a; Smith and Hollibaugh 1997; Freifelder et al. 1998, and others). This large data set provides an excellent understanding into the complex nutrient cycling found in shallow, Mediterranean-climate estuaries such as Tomales Bay (TBWC 2003).

Nutrient dynamics within Tomales Bay are driven by both oceanic and terrestrial forces. Tomales Bay is considered a heterotrophic estuary in that ecosystem respiration or conversion of organic matter from non-estuarine sources to inorganic nutrients exceeds external supply or internal production of inorganic nutrients by about 10 percent (Smith and Hollibaugh 1998). While most of these converted organic matter is eventually either lost to the atmosphere or recycled internally, dissolved inorganic phosphorous is exported to the ocean and constitutes the primary "product" produced by the Bay that is directly available to external ecosystems (Smith and Hollibaugh 1997).

Organic matter inputs into Tomales Bay come from terrestrial sources (50 percent) and the ocean (50 percent; Smith and Hollibaugh 1998). As might be expected based on the seasonality of terrestrial and oceanic inputs, research has shown that the external supply of organic matter to Tomales Bay varies over seasonal and inter-annual time scales (Chambers 2000; Lewis et al. 2001). Terrestrial sources consist of organic matter, as well as sediment-bound and suspended forms of inorganic nutrients, from the surrounding watershed that flow into the Bay, typically during high rainfall periods. Most of this organic matter and inorganic nutrients enter the Bay through surface flows of its largest tributaries: as described earlier, Lagunitas Creek and its tributaries account for approximately two-thirds of the surface water freshwater flow to the Bay, while Walker Creek and other small drainages account for the remaining one-third (Fischer et al. 1996). However, during the summer, groundwater discharge into the Bay contributes about as much nutrient load as does streamflow, while, during the winter, it contributes about 20 percent of that of the much higher winter streamflows (Oberdorfer et al. 1990).

Some of the organic matter and inorganic nutrients in surface waters -- and perhaps even groundwater depending on the discharge point -- flow through fringing and deltaic marshes on the perimeter of Tomales Bay before entering Bay waters. A study on two small, at least partially diked deltaic marshes just northeast of the Giacomini Ranch showed that, in some marshes with well-developed channels, short water residence times resulting from channelization of short-duration, high-intensity flows may decouple these systems from the nutrient pathway during the winter, reducing their effectiveness in filtering contaminants (Chambers et al. 1994). However, these same systems act as sources of inorganic nitrogen and phosphorous to the Bay during the summer, probably due to breakdown of organic matter (Chambers et al. 1994).

Oceanic sources come from upwelling or funneling of ocean-derived organic matter in offshore currents. The most intensive upwelling occurs during the summer, in response to strong, often persistent northwesterly winds (Smith and Hollibaugh 1998). Upwelling elevates the concentration of particulate organic matter in the coastal waters, which is then delivered to the bay by tides and particle settling (Smith and Hollibaugh 1998). Direct inorganic nutrient delivery from coastal upwelling in the Pacific Ocean is not of major importance to Tomales Bay, but may be important indirectly by affecting nutrient dynamics or cycling within the bay (Smith and Hollibaugh 1998).

As discussed earlier, tides, temperature, salinity, and freshwater inflow rates affect nutrient circulation patterns in Tomales Bay. During the winter, spring, and early summer, the substantial volume of freshwater inflows to the Bay results in a considerable exchange of organic matter and nutrients between the inner and middle portions of the Bay and the outer Bay and ocean. However, as freshwater flows decrease, circulation mechanisms shift from salinity-driven to temperature-driven gradients, which results in weaker exchange of waters between at least the middle and portions of the inner Bay and the outer Bay and ocean (Harcourt-Baldwin 2003). This increases water residence time and persistence of nutrients within the Bay from several days during the winter to more than a month in the summer (Smith and Hollibaugh 1998). As noted earlier, water in the northern 3.73 miles of the bay exchanges with nearshore coastal water on each tidal cycle, while

water in the southern 8.7 miles of the bay is resident for approximately 120 days during times of low runoff (Hollibaugh et al. 1988).

In the innermost portions of the Bay, absence of a salinity or temperature gradient with the middle and outer portions can effectively eliminate exchange of waters between these regions (Hearn and Largier 1997, Largier et al. 1997a). This phenomenon, which is accompanied by hypersaline conditions, apparently causes a buildup in dissolved inorganic phosphorous, as well as severe depletion of dissolved inorganic nitrogen (Largier et al. 1997a). Understandably, hypersaline systems "are very susceptible to pollution as even small loadings during the hypersaline phase may be recycled and accumulate, rather than being flushed from the system" (Largier et al. 1997a).

Internal sources of energy or organic matter to Tomales Bay also exist in the form of algae. Algae represent important components of the estuarine food web, as well as sensitive indicators of ecosystem health. Dramatic increases in dissolved or sediment-bound nutrients, combined with warm temperatures and stagnant water conditions, stimulates algal growth, sometimes excessive densities of algae called algal blooms. Besides being sometimes unsightly, algal blooms play havoc with ecosystems by causing massive swings in dissolved oxygen content of waters through over-production of oxygen during the day and depletion at night through uptake or even algae die-off. This oxygen depletion can result in a "fish kill" event in which fish and other aquatic organisms die to the lack or sudden decrease in oxygen. Die-offs of algae can also boost nutrient concentrations through recycling of organic matter. In addition, excreted material from large concentrations of consumers such as bivalves, waterfowl, shorebirds, and even mammals such as seals can noticeably affect localized nutrient concentrations, primarily through increases in ammonia (Judah 2000).

Despite water quality problems, Tomales Bay has not been characterized as an eutrophic estuary (Cole 1989; Chambers 2000; Lewis et al. 2001). Studies in 1985-1986 in Tomales Bay indicated that spatial and temporal variations in primary productivity were similar to variations in phytoplankton biomass (Cole 1989). During summer months productivity was highest in the seaward and central regions of the bay and lowest in the shallow landward region (Cole 1989). This lack of sustained high phytoplankton concentrations suggests that the shallowness of the southern region, its shallow photic depths, wind-induced turbidity, and feeding of benthic organisms keeps the populations at a lower level than other parts of the bay (Cole 1989). However, little is known about the phytoplankton dynamics in Tomales Bay and the shifting location of the maximum chlorophyll-a concentrations – variable used to measure phytoplankton – during different sampling periods indicates the dominant processes controlling phytoplankton biomass vary (Cole 1989).

In general, little is known about the nutrient status of Tomales Bay or the primary sources of nutrients to the Bay. A review of the current literature indicates that the nutrient levels in the watershed could be elevated, but the database is not very extensive (TBWC 2002). With so little seasonal data on nutrient loading from the watershed and nutrient levels in Tomales Bay, trends cannot be determined (TBWC 2002). In addition, most of the 12 water quality studies conducted in the watershed and bay have emphasized total and fecal coliform measurements and not nutrient levels (TBWC 2002). The data that is available has suggested that nutrients are a problem for the Bay and subwatersheds, which is why these areas have been listed by the RWQCB as impaired for nutrients. The RWQCB will be preparing a TMDL for nutrients, but it is not scheduled for the near future (http://www.waterboards.ca.gov/sanfranciscobay/tmdlmain.htm).

There are a few long-term or more intensive synoptic programs. CDFG conducted a 10-year sampling program between 1991-2001(Rugg 2000; Rugg 2002). Results from the last two years of this study showed that standards were exceeded for only three measurements (DO levels and un-ionized ammonia) out of 329 in 1998-1999 and only two measurements (DO levels) in 1999-2000 (Rugg 2000, Rugg 2002). Studies conducted in the upstream portions of the Lagunitas Creek by the Park Service found that nutrients, nitrites, and unionized ammonia did not appear to be problematic, at least in the upper portions of the watershed (Ketcham 2001). Nearly all of the samples collected from the larger stream systems and most of the tributary samples were below detection limits (Ketcham 2001). Interestingly, at least one comparison between historical and current conditions suggested that, after more than a century of discontinuities in sedimentation and material export, export of sediment-bound forms of nitrogen and phosphorous from the upper portions of the watershed appears to have reached steady-state conditions (Smith et al. 1996).

As with pathogens, the primary sources of nutrients to the Bay include agricultural operations (e.g. dairies and beef cattle), leaking or poorly constructed septic systems, domesticated animals such as horses, and non-point source run-off from communities. Because of the preeminence within this rural watershed and concentrated number of cattle, dairies have received the most scrutiny. The Chambers et al. (1994) paper correlated "dairy runoff from pasture lands" in the watershed of one of the two study marshes with

consistently high dissolved ammonium and phosphate in downstream marsh waters. However, two recent studies that nutrient loading from animal agriculture may not be as high as previously indicated, particularly loading from pastures (Regional Water Quality Control Board (RWQCB) 1995b); Lewis et al. 2001 *in* TBWC 2002).

In addition, even in situations where dairies are contributing nutrients to the system, an overall decrease in agricultural activities within the Tomales Bay watershed may be the reason that export of nitrogen and phosphorous to the Bay has decreased and reached steady-state conditions (Smith et al. 1996). Not only do dairies generate nutrients, but cattle can cause increases in land erosion. Erosion not only impacts downstream water quality through increases in turbidity and associated decreases in water clarity, but many nutrients, contaminants, and pathogens are principally transported in water as bound or sorbed to sediment particles. Estimates of sediment-bound nutrients vary widely, but, in general, phosphorous appears to be transported bound to sediment more than nitrogen, although nitrogen estimates still ranged as high as 51-57 percent in some systems (Meybeck 1984, Haith and Shoemaker 1987; Walling et al. 1997). Most inorganic nitrogen is transported as soluble nitrate, however, where erosion rates and sediment yields are high, the sediment-associated component of the total nitrogen and phosphorous loads will predominate (Walling et al. 1997). For these nutrients, sediment transport processes, primarily suspended sediment processes, largely govern which areas become "sinks." As with nutrients, specific information on turbidity, sediment transport processes, and transport of particulate and dissolved forms of nutrients within Tomales Bay is scarce, as most of the past studies have focused largely on changes to the bay's bathymetry or creek geomorphological processes due to increases – or decreases – in sediment supply.

Giacomini Ranch. Water quality within the Giacomini Ranch has been monitored for four years as part of the planning process. In general, between 2001 and spring 2006, waters within the Giacomini Ranch did not appear to be eutrophic (Parsons and Allen 2004a). With a few exceptions, parameters such as dissolved oxygen, pH, and nitrates only occasionally exceeded water quality objectives in the RWQCB *San Francisco Basin Water Quality Control Plan* or Basin Plan (RWQCB 1995a), which incorporates Tomales Bay as well as San Francisco Bay (Table 9). There were low to moderate concentrations of nutrients and chlorophyll a, even in drainage ditches, with the exception of seasonal pulses (Parsons, *in prep*.). Also, dissolved oxygen and chlorophyll a levels were not characteristic of either highly eutrophic or hypoxic systems, with the exception of some of the drainage ditches and sloughs in the eastern portion of the Project Area (Parsons, *in prep*.).

The RWQCB Basin Plan (1995a) stipulates that, in tidal waters, dissolved oxygen must have a minimum concentration of 5.0 mg/L (approximately 50 percent dissolved oxygen at 15.0 degrees Celsius), and the oxygen concentration for three consecutive months shall not be less than 80 percent of the saturated dissolved oxygen concentration. For non-tidal waters, the dissolved oxygen concentration minimum is 7.0 mg/L for cold water habitat and 5.0 mg/l for warm water habitat. Within some of the ditches and channels in the East Pasture, dissolved oxygen concentrations consistently fell below 5 mg/L within both surface and bottom waters of some ditches and ditched sloughs and were typically even below 2 mg/L (Table 10; Parsons, *in prep*.). The RWQCB objective of 5.0 mg/L was exceeded during 56 percent of the sampling periods in the East Pasture, with oxygen levels below hypoxia (< 2.0 mg/L) and anoxia (<0.5 mg/L) 31 percent and 14 percent of the sampling periods, respectively (Parsons, *in prep*.). The observed hypoxia-anoxia may have been caused by increased oxygen demand from bacteria breaking down organic matter or detritus from vegetation that was disturbed by ditch maintenance (Parsons, *in prep*.). Low dissolved oxygen concentrations also occurred in some of the non-ditched features in the East Pasture, including the East Pasture's New Duck Pond, where a majority of values below 5 mg/L: the New Duck Pond is a shallowly ponded, artificially created feature that was maintained until recently through seasonal flooding of pumped irrigation waters (Parsons, *in prep*.).

Some of the monitoring locations in Olema Marsh and on Tomasini Creek, Fish Hatchery Creek, and smaller drainages in the West Pasture occasionally had concentrations of dissolved oxygen below 5 mg/L (Table 10; Parsons, *in prep*.). RWQCB objectives were exceeded between 21 and 29 percent of the sampling periods in the West Pasture, Tomasini Creek, and Olema Marsh (Parsons, *in prep*.).

Most of these events occurred in the spring or summer, when oxygen concentrations might be affected by a combination of nutrient loading, increased temperature, decreased flow conditions, and, consequently, an increase in primary productivity that could create rapid diel variation in oxygen levels (Parsons, *in prep*.). Some of the lowest dissolved oxygen concentrations for Lagunitas Creek within the Project Area occurred in April 2003, with most sampling events recording concentrations slightly higher than 5 mg/L ; Parsons, *in*

prep.). These comparatively low concentrations may be tied to upstream reservoir releases of poor quality water or nutrient loading from cattle in portions of the creek upstream of the Project Area (KHE 2006a). With some exceptions, surface waters within the Giacomini Ranch generally appeared to meet RWQCB Basin Plan (1995a) objectives for pH in surface waters (Table 10; Parsons, *in prep*.). According to the Basin Plan, pH should fall within the range of 6.5 and 8.5. USEPA standards for freshwater stipulate that pH should be within the 6.5 and 9.0. The West Pasture had the highest number of exceedances for pH, with pH exceeding standards during approximately 9 percent of the sampling periods: most of these exceedances came from pH being below 6.5 (Table 10, Parsons, *in prep*.). The East Pasture exceeded pH standards during approximately 7 percent of the sampling events, with exceedances somewhat equally split between being above or below standards (Parsons, *in prep*.). Several factors control pH within waters of transitional zones, including tidal influence, the chemistry of surface waters and groundwater, seasonal variation in primary productivity, and biogeochemical reactions within underlying soils. In general, waters in the Project Area appear to be largely circumneutral (~7; Parsons *in prep*.). Baseline pH appeared higher in areas that are either tidal or tidally influenced, as tidal waters tend to be more alkaline (~ 7.8), and in upstream portions of creeks that flow off the Inverness Ridge (Fish Hatchery Creek, 1906 Drainage; ~7.8 – 8.1), which may be related to the underlying chemistry that exists from weathering of this granite-dominated geologic formation (Parsons, *in prep*.). In other cases, water pHs with more basic or alkaline values (>8.5) may have resulted from the fact that, during spring and summer, primary productivity of algae is highest due to nutrient loading, warm temperatures, and decreased flow conditions: photosynthesis by algae increases pH by removing acidic compounds such as carbon dioxide (Parsons, *in prep*.).

TABLE 10. LIST OF FREQUENCY OF EXCEEDANCE OF RWQCB BASIN WATER QUALITY OBJECTIVES DURING SAMPLING PERIODS

Criteria that are not listed can be found in Table 9. Percentage refers to percentage of sampling events in which objective was exceeded by a single sample: it should be noted that some standards are linked to means or medians of a group of samples collected over specific time periods. Areas are WP (Giacomini Ranch West Pasture), EP (Giacomini Ranch East Pasture), OM (Olema Marsh), TOM (Tomasini Creek), and LAG (portion of Lagunitas Creek in Project Area).

	Consistently Exceed (≥75%)	Regularly Exceed (≥50%)	Occasionally Exceed (≥25%)	Infrequently Exceed (>0%)	Never Exceed (0%)
Dissolved Oxygen (>5.0 mg/L)		EP	OM	WP, TOM, LAG	
pH (>6.5 and <8.5)				EP, WP, TOM, OM, LAG	
Nitrates					
USEPA (10 mg/L)				EP, TOM	WP, OM, LAG
AWWA (1 mg/L)		EP, OM	LAG, WP, TOM		
Nitrites					
USEPA (1mg/L)				EP	WP, OM, TOM, LAG
Unionized Ammonia *(≤ 0.16 mg/L)*				EP, LAG	WP, OM, TOM
Fecal Coliform (Based on Percentile Values for Individual Sample Events)					
Shellfish Harvesting (<43 mpn/100ml)	All				
Municipal Water Supply (<20 mpn/100ml)	All				
Water Contact Recreation (<200 mpn/100ml)	EP, OM, WP	LAG, TOM			
Non-Contact Water Recreation (<2,000 mpn/100ml)		EP	LAG, OM, WP, TOM		
TMDL-Lagunitas Creek (<200 mpn/100ml)	EP, OM, WP	LAG, TOM			
TMDL Load Allocation-Lagunitas at Green Bridge (<96 mpn/100ml)	LAG1				

Source: Parsons, *in prep.*

Conversely, baseline pH might be slightly depressed (~5.9 – 6.6) in locations primarily influenced by groundwater (Parsons and Allen 2004a). Water pHs with more acidic values (~5.9 - 6.4) were found in drainage ditches and shallow seasonally flooded areas due probably to breakdown of organic matter and production of humic acids or other biogeochemical acid-producing processes (Parsons, *in prep*.). At least one of these shallowly flooded areas in the West Pasture may have largely accounted for the comparatively high number of exceedances of Basin Plan objectives (Parsons, in prep.). Interestingly, while surface waters within Lagunitas Creek within the Project Area had only one exceedance of Basin Plan objectives, some limited sampling on portions of Lagunitas Creek between the Green Bridge and Nicasio Creek revealed that pH levels in deeper portions of some of the pools were considerably reduced, with pHs ranging from 3.9 to 5.2 (KHE, unpub. data).

Nitrates appear to be the most abundant nutrient in the Project Area (Parsons, *in prep*.). Nitrate concentrations between 2001 and summer 2006 in the Project Area were generally moderate (50 percent of values between 0.43 and 1.7 mg/L) and somewhat similar in terms of median value to undiked reference tidal marshes (Parsons and Allen 2004a, Parsons, *in prep*.). Nitrates typically occur when ammonia is converted to nitrates under well-oxygenated conditions and have been linked sometimes to the influence of leaking septic systems on groundwater. Average nitrate concentrations calculated using statistical procedures to estimate values that were below the laboratory detection limits ranged from as high as 7.25 mg/L in East Pasture to as low as 0.92 mg/L in the portion of Lagunitas Creek in the Project Area, with average values for Olema Marsh, Tomasini Creek, and the West Pasture being 1.45 mg/L, 1.44 mg/L, and 1.14 mg/L (Parsons, *in prep*.). Average nitrate concentrations in undiked reference wetlands had a tighter range between 0.83 mg/L and 0.88 mg/L (Parsons, *in prep*.). Average concentrations in the East Pasture were highly skewed by several very high values that exceeded USEPA objectives, as evident from the much lower median value, 1.3 mg/L (Table 10; Parsons, *in prep*.). Mean nitrate concentrations in the East Pasture exceeded the USEPA human consumption limit of 10 mg/L at least 11 times between spring 2001 and summer 2006. In addition, the higher average concentrations suggest that the Project Area occasionally to regularly exceeds standards recommended for preventing eutrophication in estuaries and maintaining at least moderate aquatic diversity (1.0 mg/L; American Water Works Association (AWWA) 1990; Table 10). Winter concentrations were highest, with pulses often observed during October and January rainfall events (Parsons, *in prep*.). Within the East Pasture, the consistently highest concentrations of nitrate were detected in the drainage ditches and a ditch that receives seep and spring groundwater flow, as well as stormwater run-off from the town of Point Reyes Station and Giacomini Ranch feed lots (Parsons and Allen 2004a). Based on monitoring data, nitrate concentrations in the East Pasture are higher than many other dairies the Seashore (range of means = ~1.8 - 5.27 mg/L; Ketcham 2001), although this data is limited, and means were calculated using different procedures to estimate values below laboratory detection range.

As might be expected, despite high concentrations in several sampling locations in the Project Area, the highest instantaneous loading rates for nitrates – or total volume of nitrates discharged at a single point in time based on stream discharge and capacity -- came from Lagunitas Creek (mg/s; Parsons, *in prep*.). Instantaneous loading rates averaged 10.1 mg/s for Lagunitas Creek, but this average was skewed by loading during storm events, as evident by the median loading rate of 0.66 mg/s (Parsons, *in prep*.). During an April 2006 storm, instantaneous loading rates of nitrates in Lagunitas Creek reached as high as approximately 220 mg per second (Parsons, *in prep*.). Conversely, the highest instantaneous loading rates recorded during four years of discrete sampling for some of the other creeks, drainages, and seeps totaled only 0.27 mg/s for 1906 Drainage, 0.96 mg/s for Fish Hatchery Creek, 1.29 mg/s for Bear Valley Creek, and 2.22 mg/s for Tomasini Creek (Parsons, *in prep*.). These sites had instantaneous loads averaging well below 1 mg/s (0.018-0.44 mg/s), with the exception of Tomasini Creek (2.94 mg/s; Parsons, *in prep*.). However, technically, these areas do not discharge to downstream water bodies because of the levees and tidegates, so there is no active loading, except perhaps during those infrequent periods when the Giacominis have discharged ditch water to Tomales Bay or when floodwaters overflow the levees.

When oxygen in waters is low, an intermediary form of nitrogen, nitrites, can occur that can cause asphyxia in humans and wildlife by binding to hemoglobin and reducing oxygen transport. Nitrites were almost always below the detection limit (Table 10), although they were infrequently detected (4 exceedances) in the East Pasture, with at least one exceedance of USEPA objectives of 1.0 mg/L for human consumption (Parsons, *in prep*.). Based on RWQCB standards, there were four exceedances of nitrite levels considered toxic to aquatic organisms (>0.5 mg/L), with three of these in the East Pasture ditches and one in an undiked marsh (Parsons, *in prep*.).

Overall, ammonia concentrations between 2002 and summer 2006 were generally either non-detect (0.2

mg/L) or moderately low (90th percentile = 0.51 mg/L; Parsons, *in prep*.). The presence of higher concentrations of ammonia, which is often bound to sediment when transported, typically can be traced to the recent or nearby presence of wildlife or livestock or use of ammonia fertilizers, as ammonia is quickly converted to nitrates under well-oxygenated conditions. The well-oxygenated conditions within most of the Project Area appear to be quickly converting ammonia to nitrates, with ammonia concentrations highest in those sampling locations where oxygen levels are consistently low (Parsons, *in prep*.). These locations included the Giacomini Ranch's East Pasture drainage ditches, the drainage ditch receiving groundwater and feedlot-influenced stormwater run-off from Point Reyes Station, ponded areas in the West Pasture, and in Lagunitas Creek following a potential discharge of flood waters from the pasture (Parsons and Allen 2004a). The East Pasture accounted for approximately 50 percent of the ammonia detections and almost all of the ones in which ammonia concentrations exceeded 1 mg/L, which represented approximately 5-6 percent of the recorded observations (Parsons, *in prep*.). However, even in these areas, high concentrations typically represented seasonal pulses (Parsons and Allen 2004a).

There are no Basin Plan standards for ammonia (RWQCB 1995a), but the RWQCB has established objectives for unionized ammonia. In waters with elevated pH, temperature, and/or salinity, ionized ammonia converts to unionized ammonia, which is toxic to aquatic organisms. Only two sampling locations exceeded the maximum general limit for most estuarine waters of 0.16 mg/L (Table 10; RWQCB 1995a; Parsons, *in prep*.). These maximum exceedances occurred in a Giacomini Ranch East Pasture drainage ditch and in a downstream Lagunitas Creek sample in April 2003 that may have received stormwater discharge from the pastures.

As with ammonia, total dissolved phosphate concentrations between 2002 and summer 2006 generally fell below or slightly above the detection limit (<0.0.05–0.20 mg/L), with the exception of the Giacomini Ranch's East Pasture drainage ditches (Parsons, *in prep*.). Phosphate concentrations averaged 0.98 mg/L in the Project Area, compared to 0.24 mg/L in undiked reference marshes and 0.14 mg/L in source creeks that flow into the Project Area (Parsons, *in prep*.). The presence of phosphates in the surface waters may be directly attributed to human and agricultural activity, including septic discharges, but phosphates are also more prevalent in marine-influenced waters. The Basin Plan objectives focus on the linkage between high concentrations of phosphates and growth and sometimes overgrowth of algae. No specific concentration-based objectives are presented in the Basin Plan (RWQCB 1995a), however, the recommended concentration of phosphorous to prevent algal blooms within estuaries is 0.01 to 0.1 mg/L (NOAA/EPA 1988), which is generally below the detection limit for phosphates in the Seashore's monitoring program.

Measurable concentrations of phosphates were primarily detected in the Giacomini Ranch's East Pasture drainage ditches and ranged from 0.24–6.8 mg/l (KHE 2006a). Concentrations at other locations such as Lagunitas, Fish Hatchery, and Tomasini Creeks were at or below detection limit (0.10 – 0.20 mg/L) for a majority of the monitoring events (KHE 2006a). Mean phosphate concentrations calculated using statistical procedures to estimate values that were below the laboratory detection limits ranged from 2.4 mg/L in the Giacomini Ranch East Pasture to 0.12 mg/L in the portion of Lagunitas Creek in the Project Area, with other mean values estimated as 0.24 mg/L for Olema Marsh, 0.15 mg/L for the Tomasini Creek, and 0.13 mg/L for Fish Hatchery Creek and the West Pasture, and (Parsons, *in prep*.). Again, mean values were skewed pulses of phosphates, particularly in the East Pasture, which had median concentrations of 1.65 mg/L, with differences between mean and median less dramatic in other portions of the Project Area (median values ~0.07 to 0.23 mg/L; Parsons, *in prep*.). The hypoxia to even anoxia that exists in East Pasture ditches would encourage flux of phosphates from sediments in the ditch. With the exception of the East Pasture, phosphate levels within the undiked reference wetlands were actually similar to those in the Project Area or even slightly higher, ranging between 0.16 to 0.37 mg/L for average concentrations and 0.14 to 0.30 mg/L for median concentrations (Parsons, *in prep*.). As with nitrates, the highest loading rates for total dissolved phosphates in the Project Area – or the highest volumes of phosphates relative to stream discharge – comes from Lagunitas Creek, with loading reaching as high as 4.2 mg/s in Lagunitas Creek and maximum values for other creek and drainages being no higher than 0.2 mg/s (Parsons, *in prep*.). Instantaneous loading averaged 0.18 mg/s for Lagunitas Creek, with average loading rates in other portions of the Project Area much lower, ranging from 0.002 mg/s (West Pasture) to 0.05 mg/s (Tomasini Creek; Parsons, *in prep*.). Again, the influence of storms and other possible discrete influxes of phosphates is evident in median values, which ranged from less than 0.0001 mg/s to 0.03 mg/s (Lagunitas Creek; Parsons, *in prep*.).

There are no numerical Basin Plan (RWQCB 1995a) objectives for ambient turbidity conditions. To some degree, measurements of turbidity generally showed a seasonal trend, with the highest values surprisingly in spring, summer, or early fall: turbidity is typically expected to be highest during the winter when sediment is being actively moved by creeks (Parsons, *in prep*.). The production of suspended particles may be due to

events such as upstream dam releases, biological activity, cattle activity, earth-moving and other activities within streams, ditches, and other water bodies (KHE 2006a). Turbidity values in Lagunitas Creek were generally below 50 Nephelometric Turbidity Units (NTU), with the exception of the highest measured turbidity of 266 NTU at the Giacomini Ranch north levee in June 2003 (Parsons, *in prep*.). This measurement may be an anomaly or the result of exchange with downstream Tomales Bay waters during an incoming tide or discharge of pasture waters from an adjacent pump, as values upstream in Lagunitas Creek never exceeded an NTU of 26 on this same date (Parsons, *in prep*.). In Tomasini Creek, turbidity generally ranged between 1 and 40 NTU, with spikes occasionally above 50 NTU occurring during the fall (KHE 2006a). Turbidity values for Fish Hatchery Creek generally fell below 50 NTU, with seasonal spikes over 50 NTU observed during the summer of 2003 and 2004 at downstream locations in the West Pasture (KHE 2006a).

Water temperature is controlled by standards established in a separate document that focuses primarily on elevated temperature water discharges such as cooling waters from power plants, but the Basin Plan does specify that the natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated that such alteration in temperature does not adversely affect beneficial uses (RWQCB 1995a). Water temperatures varies seasonally within the Project Area, with warmer predominant during the spring, summer, and early fall, when solar radiation increases and water levels decrease (Parsons, *in prep*.). While all organisms are sensitive to high temperatures, temperature has been identified as limiting factors for certain species, including salmonids. Salmonids use downstream transitional zones of tidal creeks for resting habitat during upstream migration in the winter and for refugia and foraging during outmigration during the spring and summer. During two years of monthly monitoring, temperature in streams known to have supported or that are currently used by salmonids, at least on an intermittent or seasonal basis, ranged from an average of 54.2 degrees Fahrenheit (upper portion of Fish Hatchery Creek in Project Area near Sir Francis Drake Boulevard) to 60.3 degrees Fahrenheit (upper portion of Lagunitas Creek in Project Area between White House Pool and Green Bridge; Parsons, *in prep*.).

Continuous temperature monitoring in upstream portions of Lagunitas Creek during the spring and early summer when salmonid outmigration numbers typically peak showed a steady increase in water temperatures from an average of approximately 56.3 degrees Fahrenheit and range of 48.2 to 64.4 degrees Fahrenheit in April 2003 to an average of approximately 65.3 degrees Fahrenheit and range of 59 to 71.6 degrees Fahrenheit in June 2003 (Parsons, *in prep*.). Water temperatures between monitoring locations both in open water and underneath overhanging riparian trees were almost identical despite the fact that riparian vegetation usually helps to keep water temperature lower due to the effects of shading on solar radiation (Parsons, *in prep*.). During a 24-hour period, temperatures typically varied by as much as approximately 6.3 to 10.5 degrees Fahrenheit (Parsons, *in prep*.). One monitoring location consistently had the both the lowest temperatures and the widest daily variation in temperature: the lowest temperatures were consistently 1.8 to 5.4 degrees Fahrenheit lower than other monitoring locations, although the daily highs were often similar (Parsons, *in prep*.). This monitoring location occurs just downstream of the confluence of Bear Valley Creek and Lagunitas Creek on the south bank underneath overhanging riparian vegetation and may be affected by nighttime cooling of waters within Olema Marsh that subsequently flow into Lagunitas Creek (Parsons, *in prep*.).

Olema Marsh. Water quality monitoring in Olema Marsh was not initiated by the Park Service until August 2004, so the amount of data available from which to draw a conclusion regarding resource conditions in Olema Marsh is more limited. While Bear Valley Creek occurs in a relatively pristine watershed, water quality conditions were only slightly better than Giacomini Ranch (Table 10; Parsons, *in prep*.). Dissolved oxygen concentrations generally averaged around 7.4 mg/L, although levels were below 5 mg/L during approximately 29 percent of the sampling events, including in August 2005, when levels dropped as low as 2.6 to 4.17 mg/L (Parsons, *in prep*.). The hypoxic conditions were recorded just upstream of Olema Marsh in lower Bear Valley Creek during the morning, which suggests that supersaturation during the midday and afternoon of the previous day may be resulting in anoxia or oxygen depletion during the night in this sluggish, marshy portion of the creek (Parsons, *in prep*.). However, dissolved oxygen concentrations never dropped below 2 mg/L. Water pH also remained consistently circumneutral during all monitoring events, averaging 7.0 and only dropping below RWQCB standards on one occasion (<6.5; Parsons, *in prep*). Turbidity levels never exceeded 50 NTU, ranging from 5.13 to 28.8 NTU (Parsons, *in prep*.). Water temperatures in Olema Marsh ranged from as low as 50 degrees Fahrenheit in the winter to as high as 59 to 70 degrees Fahrenheit in the summer, averaging approximately 58.1 degrees Fahrenheit (Parsons, *in prep*.).

Nitrates never exceeded USEPA water quality objectives of 10 mg/L for human consumption, but regularly exceeded during more than 67 percent of the sampling events levels recommended for preventing

eutrophication in estuaries and maintaining moderate aquatic organism diversity (1.0 mg/L). Average and median nitrate concentrations were roughly equivalent – 1.45 and 1.6 mg/L, respectively, with values ranging from 0.2 to 2.9 mg/L (Parsons, *in prep*.). Concentrations flowing into Olema Marsh almost always exceeded those flowing out of the marsh, which suggests an upstream source for this nutrient (Parsons, *in prep*.). Nitrate concentrations generally decreased between upstream and downstream sampling locations between 7 and 87 percent (Parsons, *in prep*.). Nitrate loading rates at the upstream sampling location ranged from much less than 0.0001 mg/s to 2.7 mg/s during a 2006 sampling event that occurred after a large series of storms (Parsons, *in prep*.). During this sampling event, nitrate loading rates at the downstream location within Olema Marsh plummeted to as low as 0.14 mg/s, representing almost a 100 percent drop in concentrations (Parsons, *in prep*.). Instantaneous nitrate loading averaged 0.33 mg/s for both upstream and downstream locations, with a median loading value of 0.06 mg/s (Parsons, *in prep*.).

Nitrites were generally not detected (<0.05 mg/L), except for one slightly elevated observation (0.07 mg/L) at the downstream location that did not exceed Basin Plan standards (RWQCB 1995a; Parsons, *in prep*.). Ammonia has not been detected (detection limit < 0.2 mg/L), and phosphate concentrations were typically just slightly above detection limits (0.2 mg/L), ranging from 0.2 to 0.35 mg/L and averaging 0.24 mg/L (Table 10; Parsons, *in prep*.). No clear upstream-downstream trend for phosphates was apparent, with the marsh probably sometimes functioning as a sink and other times as a source (Parsons, *in prep*.). An increase in phosphate concentrations being discharged from Olema Marsh may result either from re-suspension of phosphates in sediments, excretion by aquatic organisms, or influx from some outside source of phosphates such as leaking septic systems (Parsons, *in prep*.).

Fecal Coliform

Tomales Bay. For decades, fecal coliform has been used as an indicator for the presence of pathogenic bacteria that could negatively affect human and wildlife health. Pathogenic bacteria are typically transmitted through human and animal feces, which enter streams and other water bodies either directly through cattle being in creeks or boats discharging sewage or indirectly through leaking septic systems or sewage treatment facilities. Because of the potential impact that bacteria have on shellfish production, research and monitoring for pathogens has been more extensive than that for nutrients. As early as 1967, the Pacific Marine Station and NMWD found that Tomales Bay had fecal coliform levels that were high during the winter runoff periods (Smith et al. 1971 *in* TBWC 2002). Since then, several intensive studies on bacteriological water quality of the Bay and its tributaries have been conducted over the past 28 years, which were summarized in the Staff Report for the pathogen TMDL (Ghodrati and Tuden 2005). These studies include:

- A 1974 shellfish and water quality study by the California Department of Health and Human Services (Sharpe);
- A shoreline and watershed water quality survey carried out in 1976-1977 and 1977-1978 by the RWQCB;
- A sanitary survey conducted by DHS;
- A pilot study conducted by DHS in the winter of 1994–95 to test sampling methods and locations for the 1995–96 study;
- A RWQCB-funded study conducted in 1995–96 by DHS and the RWQCB, under the auspices of the Tomales Bay Shellfish Technical Advisory Committee (TBSTAC); and
- A second RWQCB-funded study conducted in 2001 by the RWQCB and TBSTAC with assistance from the Seashore.

The results of these studies indicate that Tomales Bay and its tributaries have exceeded shellfish and water quality standards over the last three decades (Ghodrati and Tuden 2005). In 1974, DHS designed a study (TBSTAC 2000 *in* Ghodrati and Tuden 2005) to determine the water quality of Tomales Bay and tributary streams during wet weather conditions and relate the results to the bacteriological quality of the shellfish grown in the Bay. Shoreline samples showed elevated total and fecal coliform levels at numerous stations, which were attributed to the possibility of shoreline drainage, tributary streams entering the Bay, and possible failing septic systems. The study concluded that the high coliform counts were due to contribution of wastes by upstream dairies and, in lower Keyes Creek, from raw sewage discharges from the town of Tomales.

The RWQCB conducted a shoreline and tributary sampling survey during the winters of 1976–77 and 1977–78 (TBSTAC 2000 *in* Ghodrati and Tuden 2005), to evaluate the effectiveness of the RWQCB's recent requirements for dairy waste practices. Stream conditions improved for areas in which dairies had come into compliance with the minimum guidelines, although none of the shoreline or stream stations sampled met coliform objectives for water contact and non-contact recreation following periods of rainfall. Stream stations

showed decreases in coliform between 1976–77 and 1977–78 following implementation of the minimum guidelines. The report also concluded that sewering of the town of Tomales in June 1977 resulted in decreased levels of coliform in Keyes Creek downstream of developed areas.

In 1980, the Food and Drug Administration (FDA), to determine the degree of pollution and the recovery rate of the Bay during periods of rainfall, conducted a sanitary survey from February 24 through March 12 (TBSTAC 2000 *in* Ghodrati and Tuden 2005). The results of this study showed that the shellfish market standard for fecal coliform was exceeded in all Bay water quality stations during wet periods. The dry period samples met the standard, with the exception of stations at the head of the Bay and near the mouth of Walker Creek. Seven out of eight shellfish samples exceeded the market standard. Fecal coliform densities in the streams during dry weather were equal to sewage from about 150 to 200 people. During wet weather, fecal coliform densities increased to the equivalent of sewage from 1,500 to 2,000 people or 500 to 700 cows. The highest loadings following rains revealed a bacterial equivalent of 40,000 to 50,000 people or 15,000 to 20,000 cows. The 1980 study concluded that the portions of the Bay most seriously affected by pollution from rainfall and runoff were the head of the Bay (Millerton Point south) and the Walker Creek delta. Rural and livestock sources of nonpoint pollution were considered to be the most likely cause of high fecal coliform densities in the Bay.

The pilot study conducted by DHS in the winter of 1994–95 was a prelude to the study during 1995–96 (TBSTAC 2000 *in* Ghodrati and Tuden 2005). Both of these studies were initiated as a result of Tomales Bay being listed as threatened under the Shellfish Protection Act and the formation of TBSTAC. The data from the pilot study support the theory that the major source of fecal contamination to the Bay is rainfall-related runoff from the tributaries. Two seasonal patterns of fecal coliform densities were observed: 1) sites that showed declining fecal coliform densities throughout the winter, suggesting a nonrenewable source of coliforms, and 2) sites that exhibited high fecal coliform densities throughout the season, suggesting a renewable source.

Following completion of the pilot study, the RWQCB and DHS conducted an intensive RWQCB-funded study of bacteriological and pathogen levels in the water of Tomales Bay and its watershed (TBSTAC 2000 *in* Ghodrati and Tuden 2005). As before, bacterial densities usually exceeded the standards within the first one or two days of each rainfall event, then, typically decreased to acceptable levels by the last day of sampling. Fecal coliform levels in the middle portion of Tomales Bay were generally lower than either the outer- or inner-bay regions, although all Bay stations experienced elevated concentrations of fecal coliforms immediately following rainfall. Consistently high bacterial levels were detected during most of the study at sites within the Walker/Keyes/Chileno Watershed and along the eastern shoreline watershed. Slightly lower concentrations of fecal coliforms were detected throughout the Lagunitas and Olema subwatershed. In contrast, bacterial levels at the western shoreline watershed stations were generally 10 to 100 times lower than those from all other subwatersheds. The highest loadings estimated were within the Walker/Keyes/Chileno and the Lagunitas and Olema subwatersheds. Within the Lagunitas/Olema Watershed, Lagunitas Creek contributed the largest share of the fecal load, followed by Olema Creek. The Bear Valley drainage contributed the lowest loadings for this Subwatershed.

In the winter of 2000–2001, the Water Board, in conjunction with TBSTAC and the Seashore, designed and conducted a study with the purpose of implementing some TBSTAC recommendations from the 1995–96 study. This study looked at both fecal coliform and *E. coli* as indicators for the presence of pathogens through both one-time and repeated measurements throughout three storm events, with repeated *E. coli* sampling used to estimate total loading rates for some of the sampling locations. Throughout the three wet-weather sampling events, the fecal coliform levels for all watershed and Bay station samples significantly exceeded the designated water quality objectives for shellfish harvesting waters and, in most cases, for contact and noncontact water recreation (RWQCB 2001). In general, fecal coliform levels remained high during all rainfall events sampled in all watersheds, typically increasing during the second day of each wet-weather sampling event (RWQCB 2001). Intensive time series sampling conducted on Olema Creek by the Seashore as part of this study showed that bacteria loading as represented by *E. coli* closely tracked stream discharge in terms of the rise and fall in flows, although there was often a two-hour lag in this system between peak stream discharge and peak *E. coli* levels (Ketcham 2001).

Of the inner Bay station samples, the highest fecal coliform levels were consistently detected at the inner Bay Station 1 (located south of the Tomales Bay Oyster Company lease area), which is closest to the inlet of Lagunitas and Olema Creeks (RWQCB 2001). The lower Walker Creek subwatershed contributed the highest one-time and highest overall instantaneous fecal coliform loadings (RWQCB 2001). Lower and upper San Geronimo Creek subwatersheds, which are tributaries to Lagunitas Creek, and lower (7.46×10^{13}) and upper

Lagunitas Creek (5.13×10^{13}) ranked as the second and third and fifth and sixth largest contributors, respectively, in terms of instantaneous fecal coliform loading rates (RWQCB 2001). The Keyes Creek and Olema Creek subwatersheds recorded the lowest instantaneous fecal coliform loadings, with Olema Creek estimated at 8.67×10^{12} (RWQCB 2001). While pathogens concentrations are often higher in Olema Creek than Lagunitas Creek, the greater volume of stream discharge in Lagunitas Creek increases the loading potential of Lagunitas Creek relative to Olema (Ketcham 2001). In terms of total loading, Walker Creek again had the highest loading rates per day (3.97×10^{14}), followed by Lagunitas Creek (8.66×10^{13}) and Olema Creek (7.53×10^{13}; RWQCB 2001).

Results of the 2000-2001 study support results from the pilot study, which suggested either the presence of a renewable source or the introduction of new sources of fecal coliform throughout portions of the watershed (RWQCB 2001). As with many other previous studies, the 2000-2001 report speculated that agricultural sources are one of the major contributors of pathogens to Tomales Bay, particularly as the watersheds with the highest concentrations and loadings are primarily agricultural (RWQCB 2001). The RWQCB pointed to runoff from animal pastures (containing manure) and failing onsite sewage disposal systems or as some of the potential new or renewable sources of fecal coliform (RWQCB 2001). In another 2001 study, researchers found that concentration and loading of fecal coliform in creeks near a representative dairy was three times higher than that from a control watershed (Lewis et al. 2001). However, high levels of fecal coliform observed in San Geronimo Creek, which is not heavily agricultural, and Point Reyes Station storm drains indicates that developed areas cannot be discounted as a source (Ketcham 2001).

While most previous studies loosely refer to dairy and beef cattle operations as a primary source of pathogens, the 2001 study by Lewis and colleagues (2001) attempted to better define which portions of agricultural operations might be causing problems. Results appeared to point at dairy facilities rather than pastures – even manured pastures – as the highest potential agricultural contribution to pathogen loading (Lewis et al. 2001). The worst offenders for fecal coliform included manure stockpiles, feed lots, storm drains, and facility runoff, with potential fecal coliform loading from runoff from manure stockpiles and feed lots two to sometimes three orders of magnitude greater than loading from other parts of dairy facilities (Lewis et al. 2001).

Giacomini Ranch. Based on data collected between spring 2001 and summer 2006, fecal coliform concentrations were one to eight orders of magnitude greater in the Giacomini Ranch than in undiked wetlands in Tomales Bay and elsewhere (Parsons and Allen 2004a, Parsons, *in prep*.). Fecal coliform concentrations within of all Project Area sampling locations regularly to consistently exceeded the recently established TMDL standards proposed for the Lagunitas Creek, Olema Creek, and Walker Creek watersheds, with more than 80 percent of the samples having levels higher than 200 mpn/100 ml (Table 10, Parsons, *in prep*.). The 90th percentile for the Project Area was estimated by statistical analytical techniques to be as high as 48,995 mpn/100ml, well above the 400 mpn/100 ml set by TMDL objectives (Parsons, *in prep*.). Results also show that more than 95 percent of the samples would probably have exceeded the newly established TMDL load-based allocation standards set for Lagunitas Creek at the Green Bridge (95 mpn/100 ml; Table 10, Parsons, *in prep*.).

In addition to the newly developed TMDL standards currently being finalized by the RWQCB, fecal coliform concentrations also consistently exceeded the Basin Plan standards for shellfish and municipal surface water supply beneficial uses and regularly to consistently exceeded standards for water contact recreation beneficial uses, with the Giacomini Ranch East Pasture and West Pasture and Olema Marsh exceeding 200 mpn/100 ml during more than 75 percent of the sampling events (Table 10, Parsons, *in prep*.). The Giacomini Ranch East Pasture also regularly exceeded standards for non-contact water recreation of 2,000 mpn/100 ml during more than 50 percent of the sampling events (Table 10, Parsons, *in prep*.). The 90th percentile estimated within Project Area sampling units ranged from a high of 307,254 mpn/100 ml in the East Pasture to a low of 6146.78 mpn/100 ml in Lagunitas Creek, with 7794.86 and 11558.2 estimated for Tomasini Creek and West Pasture, respectively (Parsons, *in prep*.). These numbers all exceed the 90th percentile RWQCB objectives that range from 43 mpn/100 ml for shellfish harvesting to 4,000 mpn/100 ml for non-contact water recreation. While both the East and West Pastures are used for dairying, use and land management is much more intensive in the East Pasture than the West Pasture, which is managed more as grazing land than a dairy pasture. In addition, loading to the East Pasture probably occurs through some non-point sources such as stormwater run-off from the town of Point Reyes Station, with these waters conveying waste from both domestic animal and residential sources (RWQCB 2001). At least one of the stormwater run-off sources to the East Pasture flows directly adjacent to a Giacomini Ranch feedlot in the town itself.

It should be noted that TMDL and Basin Plan standards are based on geometric means or medians for groups

of samples collected over a specific sampling period, not single samples, but for the purposes of this document, the percentage of samples exceeding the standard value was primarily used to evaluate existing conditions within the Project Area as samples were collected quarterly and not over the course of a few weeks to a month. Most of the Basin Plan objectives focus on geometric means rather than arithmetic or the more traditional mean, because bacteria concentrations are calculated in a logarithmic –based scale that is more appropriately expressed as a geometric mean that divides the number of samples by the product rather than the sum of the values. When group geometric and arithmetic means are estimated for the entire monitoring period (2001-2006), these results show that none of the sampling units within the Project Area would meet RWQCB objectives.

As with nutrients, instantaneous loading rates for fecal coliform – or volume of coliforms relative to stream discharge -- remained consistently highest in Lagunitas Creek, although concentrations were almost lower than many other sampling locations. The estimated geometric mean for all sampling events at Lagunitas Creek Green Bridge during the sampling period averaged 12,430 mpn/s (Parsons, *in prep*.). Similar to coliform concentrations, the arithmetic mean for instantaneous loading rates, which was estimated at 208,971 mpn/s, was skewed by some extremely high values, including a loading rate of approximately 10 million mpn/s during the April 2006 storm, a 2.25-year flood event (Parsons, *in prep*.). Some of the highest values for Giacomini Ranch creeks, drainages, and other water features or sources occurred several weeks after a large series of storms in May 2006, with instantaneous loading rates totaling 7,224 mpn/s for the 1906 Drainage, 10,691 mpn/s for Fish Hatchery Creek upstream of the Project Area, 494,371 mpn/s for Tomasini Creek within the Project Area (Parsons, *in prep*.). Estimated geometric mean instantaneous loading rate during all four years of monitoring for creeks flowing into the Project Area was 408.4 mpn/s, compared to 56.0 mpn/s for the Project Area (Parsons*, in prep*.). Very low loading rates for the Project Area reflect the fact that the East Pasture waters cannot discharge to downstream waters except when levees and spillways overtop or when waters are deliberately pumped into Lagunitas Creek, which occurs very infrequently, at least during recent years. In addition, discharge of creeks within the muted tidal West Pasture is comparatively low, effectively reducing its potential contribution to downstream loading. Some of the highest average instantaneous loading rates other than from Lagunitas Creek came from upstream portions of Fish Hatchery Creek and Tomasini Creek, with geometric means of 863.1 and 771.8 mpn/s (Parsons, *in prep*.).

Olema Marsh. Despite the fact that Olema Marsh is not directly within or below a dairy, fecal coliform concentrations were relatively high in the marsh, which is the downstream reach of Bear Valley Creek prior to its confluence with Lagunitas Creek (Parsons, *in prep*.). Fecal coliform levels consistently exceeded TMDL watershed and load-based standards for Lagunitas Creek and shellfish harvesting, municipal water supply, and water contact recreation beneficial use Basin Plan standards, with more than 75 percent of the sampling events having values greater than 200 mpn/100 ml (Table 10; Parsons, *in prep*.). The non-contact water recreation Basin Plan objective of 2,000 mpn/100ml was occasionally exceeded (≥25 percent of the sampling events; Table 10; Parsons, *in prep*.). For the period between 2004 – summer 2006, fecal coliform concentrations averaged 1,179.1 mpn /100 ml (geometric mean), with a 90th percentile value of 13,346.8 mpn/100 ml (Parsons, *in prep*.). These values exceed all TMDL and Basin Plan bacteria standards or objectives (Parsons, *in prep*.).

As noted earlier, TMDL and Basin Plan standards are based on log or geometric means or medians for a group of samples collected over a specific time period. The estimated geometric mean instantaneous loading rates over the two years of sampling ranged from 1,692 mpn/s at the upstream sampling location to 1,241.3 mpn/s at the downstream sampling location, with the highest values of 5.3 million and 24,080 mpn/s, respectively, again being recorded in May 2006, several weeks after a large storm series (Parsons, *in prep*.). These values exceed all but the Non-contact Water Recreation standard of 2,000 mpn established in the Basin Plan (RWQCB 1995a).

Water Salinity and Quality and Wetland Functionality

The Project Area represents one of the largest interfaces between freshwater and saltwater in Tomales Bay. These estuarine transition zones are extremely dynamic areas with large variability in salinity conditions both between seasons and years. One of the unique phenomena often associated with estuarine transition zones is Null Zones or ETM, in which salinity or the interface between freshwater and saltwater can actually affect hydrodynamic processes and potentially increase trapping of sediments, nutrients, contaminants, and pathogens. These estuarine processes act in concert with fluvial ones in which sediment, nutrients, and contaminants are deposited onto floodplains during overbank flooding of floodwaters to increase the value of these transitional zones to water quality improvement.

Without more intensive monitoring, determining the degree to which Project Area is currently functioning to improve water quality – if at all – is extremely difficult. There appears to be some evidence of downstream reduction in nitrates and coliform during certain periods, although the trend was not consistent. Nitrate and fecal coliform concentrations in Lagunitas Creek almost universally dropped between Green Bridge and the northern levee of the Giacomini Ranch and on Fish Hatchery Creek between Sir Francis Drake Boulevard and the central portions of the West Pasture, but not on Tomasini Creek between Mesa Road and middle of East Pasture (Parsons and Allen 2004a, Parsons, *in prep*.). Tomasini Creek sometimes showed increases in nutrients and fecal coliform between upstream and downstream monitoring locations, suggesting continuing contribution from point and/or non-point sources (Parsons and Allen 2004a, Parsons, *in prep*.). Similar trends were noted on other monitoring locations on the perimeter, including the drainage ditch in the Tomasini Triangle that receives non-point source run-off from Point Reyes Station and the Giacomini Ranch feedlots, as well as possible septic influences (Parsons, *in prep*.). The fact that nutrients and pathogen concentrations in the Project Area are sometimes lower than other dairy ranches in the watershed suggests that the high percentage of wetlands already present in the Project Area may be playing some role in improving water quality of drainage ditches and creeks within the pastures (Parsons and Allen 2004a).

Vegetation Resources

Vegetation plays a key and prominent role in wetland functionality. Through providing "roughness" or resistance, vegetation slows down and dissipates the energy of flood flows and traps sediment that carries bound nutrients and contaminants. In addition, vegetation and diversity of vegetation communities is integral to wetlands' ability to provide habitat for wildlife species for foraging, breeding, nesting, and refugia or protection. Even when plants die or senesce, they continue to support wildlife through export of carbon to the forest floor, streams, or downstream water bodies or by providing tree snags and large woody debris for nesting, roosting, or protection. The strong association of vegetation and wetlands – particularly as the vegetation is often so distinct -- may be one of the primary reasons why wetlands are often perceived as a vegetation resources despite the strong roles played by geology, hydrology, and soils in these dynamic ecosystems.

Regional Setting

As with other areas of western Marin County, the Seashore supports a high number of vegetation communities that are diverse in nature. More than 64 vegetation communities or "alliances" have been mapped within the boundaries of the Seashore and the north district of GGNRA, and the parks are known to support more than 900 plant species. In fact, nearly 18 percent of California's plant species are found in the Seashore. In addition, Point Reyes supports 61 plant species that are actually absent from the rest of Marin County (Howell 1970). The Seashore is also a vegetation transition area, between the Pacific Northwest flora, adapted to cold, wet conditions, and the Mediterranean flora, adapted to hot, dry conditions: Approximately 34 plant species reach their southern limit of distribution here, while Point Reyes represents the northern limit of distribution for another 11 (Howell 1970).

Nearly 18 percent of California's plant species are found in the Seashore

This diversity can be attributed in large part to this area's varied geologic history and structure, hydrology, and climate. Bordered by the San Andreas Fault, movement of the Pacific plate relative to the North American Plate has led to the Point Reyes Peninsula having a community and flora composition that is sometimes distinct from that of the Marin County "mainland." Tectonic uplifting along the fault has created an incredibly steep, varied, and unstable topography punctuated by ravines along the backbone of the Point Reyes Peninsula that borders Tomales Bay. Topography on the west side of the Inverness Ridge is more gradual as it descends to Drakes Estero and the Pacific Ocean, with many of the higher elevation upland areas characterized by soft, rolling hills.

The geologic instability of this area has produced a diverse array of hydrologic sources for vegetation communities, including isolated lakes, ponds created within "sags" along the fault, and an abundance of groundwater seeps that often serve as sources or "headwaters" for perennially and seasonally flowing streams. These freshwater influences mix with tidal waters from the Pacific Ocean to create estuarine habitats within sheltered embayments and coastlines

along the Peninsula's perimeter. Over geologic time, the Pacific Ocean has alternately encroached upon and retreated from the Marin coastline because of a number of factors, including sea level rise caused by melting of the once extensive glaciers present in North America and land uplift. Not only does this geologic action control the extent of tidal influence in this area, but it has created elevated marine depositional terraces in areas such as the town of Point Reyes Station that are extremely permeable to groundwater seepage. This seepage has created unusual wetland communities that have established on the steep sides of these mesa bluffs.

Superimposed on this geologic matrix are coastal climatic influences that create an extremely mesic or wet environment for vegetation. Unlike more inland areas, the summer season in this Mediterranean climate area often remains very cool due to extended periods of fog or marine layers. Because of this mesic influence, even upland vegetation communities such as coastal prairie often support plant species that, in inland areas, would be more typical of wetland habitats. Moisture is often concentrated within some of the steep ravines or valleys along the Inverness Ridge, leading to development of highly mesic communities dominated by coast redwood (*Sequoia sempervirens*) and Douglas fir (*Pseudotsuga menziesii*) forests on north-facing slopes with more arid shrublands on the opposing south-facing slopes. Point Reyes marks one of the southernmost boundaries of a Douglas fir forest that once stretched continuously from Sonoma County north to British Columbia (Evens 1993). Arid vegetation communities such as chamise (*Adenostoma fasiculatum*)-dominated chaparral and northern coastal scrub are often isolated in areas that receive substantially less fog and rain. While mesic conditions limit the amount of natural fires that occur, chaparral and Bishop pine (*Pinus muricata*)-dominated woodlands are naturally adapted to these often catastrophic events, quickly establishing almost monotypic stands or patches in drier areas of the coast. Point Reyes is one of few areas in California that retains relict stands of Bishop Pine (Evens 1993). The three largest vegetation community alliances in the Seashore and north district of the GGNRA are coyote brush (~17,500 acres), Douglas fir (~17,400 acres), and California annual grassland mapping unit (~15,000 acres).

Regulatory and Policy Setting

Many native vegetation communities within the United States have been adversely impacted by introduction of non-native plant species, as well as a host of other anthropogenic factors such as commercial, residential, and agricultural development, resource extraction, etc. Vegetation in the Project Area has been subject to human activities for 7,000 - 10,000 years, the period believed to be when this area first became occupied by the Coast Miwok. Although data are not available on the effects of Miwok activities on vegetation, it is assumed that they gathered plants for food and for shelter materials and probably used fire to manipulate growth of certain plant species. Beginning in the mid-nineteenth century and continuing into the present, activities such as land clearing, timbering, cultivation, cropping, road building, commercial development and livestock grazing have markedly affected the vegetation.

These activities have affected all vegetation communities, but the most highly publicized and pervasive threats are perhaps those to wetland and riparian communities: in California, more than 91 percent or 4.6 million acres of wetlands have been lost to development, and losses for the rest of the country are estimated at 50 percent (Dahl 1990). Other communities such as California coastal prairie have received less national attention, but the introduction of non-native annual and perennial grasses of European origin have almost extirpated this unique habitat, which may have once dominated large expanses of California's coastline.

In recognition of these threats, federal and state agencies have moved to protect individual species under federal and state Endangered Species Acts (ESA). The California Department of Fish and Game (CDFG) has designated certain types of vegetation communities as deserving of special consideration as special habitats or Natural Communities, although these designations do not carry the same regulatory implications as federal or state listing for endangered, threatened, or rare plant species. Many special status plant and wildlife species either reside in or use some of these sensitive vegetation communities for all or part of their life cycle. Some of these special habitats such as wetlands and riparian areas are often subject to regulatory oversight under the Clean Water Act (federal) or other state and local legislative mandates such as the Porter-Cologne Act, Streambed Alteration Agreement, and Coastal Zone LCP, because of the important role or functions that these habitats provide to both wildlife and humans.

Beyond regulatory mandates, the Park Service Management Policies (2006) require parks to preserve and restore the natural abundances, diversities, dynamics, and habitats of native plant and animal populations and the communities and ecosystems in which they occur (NPS 2001; Section 4.4.1). The Park Service is also specifically urged to not only avoid impacts to wetlands, riparian vegetation, and threatened endangered

species, but to look for opportunities to increase, restore, or reintroduce them when these habitats or species have been threatened or extirpated (NPS 2006; Section 4.4.2.3). In addition to protecting and restoring habitats and species affected by non-native species, parks are also moving towards eradication of invasive species that pose substantial threats to the integrity of native habitats and viability of special status plant species populations. Park Service Management Policies (2006) direct parks to manage and, if possible and prudent, eradicate invasive species that interfere with natural processes and the perpetuation of natural features, native species or habitats (Section 4.4.4.2). In addition, "exotic species will not be allowed to displace native species if displacement can be prevented" (Section 4.4.4).

Vegetation Communities

Some preliminary mapping of vegetation communities within the Project Area occurred as part of the Seashore's Park-wide mapping efforts during the late 1990s. Additional vegetation mapping was performed in 2002-2003 within the Study Area to increase the resolution and scope of these preliminary mapping efforts. This information was used to determine the extent and location of sensitive vegetation communities such as wetland and riparian areas, as well as rare Natural Communities designated by the California Natural Diversity Database (CNDDB).

Vegetation communities within the Giacomini Ranch, Olema Marsh, and adjoining areas (Project Area) were mapped using a combination of classification systems (Parsons and Allen 2004b). The Seashore and GGNRA currently rely on a classification system developed by Todd Keeler-Wolf and John Sawyer (1995). However, the type of vegetation communities encountered within the Project Area were not well represented in the Keeler-Wolf and Sawyer classification system, so a modified Holland (1986) system was employed, as well.

The mapping of more than 80 percent of the Project Area as Active Pasture or Agriculture during initial vegetation mapping efforts conducted by the Seashore and GGNRA suggested that the Project Area was primarily a monotypic, pastoral forb-and herb-dominated vegetation community largely shaped by agricultural activities (Parsons and Allen 2004b). However, ground-based vegetation mapping efforts uncovered an incredible amount of habitat diversity in this highly managed landscape (Parsons and Allen 2004b). There were approximately 27 vegetation communities and 99 plant associations (groupings of dominant plant species) mapped within the Giacomini Ranch and Olema Marsh portions of the Project Area (Figure 30; Parsons and Allen 2004b; Ryan and Parsons, *in prep*.). The acreages of the dominant vegetation communities are shown in Table 11, and the most prevalent of these is described in detail later in this section. Most of these communities are wetland- and riparian-associated communities or ones that are ecotonal or adjacent to habitats present (Parsons and Allen 2004b; Ryan and Parsons *in prep.*). In addition to the hydrologic, geologic, and climatic forces discussed earlier, vegetation communities within the Project Area have been shaped extensively by historical and current land management practices.

As Table 11 shows, most of the Giacomini Ranch (~ 40 percent) is comprised of Wet Pasture, which is dominated by grass and clover species (Figure 30, Parsons and Allen 2004b). Pasture areas that have subsided and/or are influenced more by saline groundwater or surface water flows have evolved into Salt Marsh Pasture -- combination of salt marsh and pasture species -- and even Diked Salt Marsh (Parsons and Allen 2004b). The predominance of communities such as Wet Pasture, Salt Marsh Pasture, Ruderal, and Disturbed strongly reflects the agricultural nature of the Project Area, although the diversity even within these highly managed habitat types is apparent in names such as "Wet" Pasture and "Salt Marsh" Pasture (Parsons and Allen 2004b).

Areas along the perimeter of the Giacomini Ranch and Olema Marsh where seeps are present or within slow-moving reaches of freshwater creeks support Forested and Scrub Shrub Riparian, Freshwater Marsh, Vernal Marsh, Wet Meadow, and Moist Meadow vegetation communities (Parsons and Allen 2004b, Ryan and Parsons, *in prep*.; Figure 30).

Freshwater Marsh systems are very diverse and are characterized by systems dominated by tall and mid-height emergent plant species, as well as low-growing and floating emergent species. Freshwater Marsh is the dominant community in Olema Marsh and lower Bear Valley Creek, followed by Forested Riparian. Due probably to grazing and other land management activities, the percentage of Scrub Shrub and Forested Riparian in and near the Giacomini Ranch is relatively low compared to Olema Marsh and Bear Valley Creek, wetlands and riparian areas. The area's hydrologic complexity undoubtedly accounts for the wide variety of totaling only 5.2 percent of that portion of the Project Area. However, the presence of groundwater springs on hillslopes adjoining the Point Reyes Mesa has led to establishment of Mesic Coastal Scrub and Scrub-Shrub

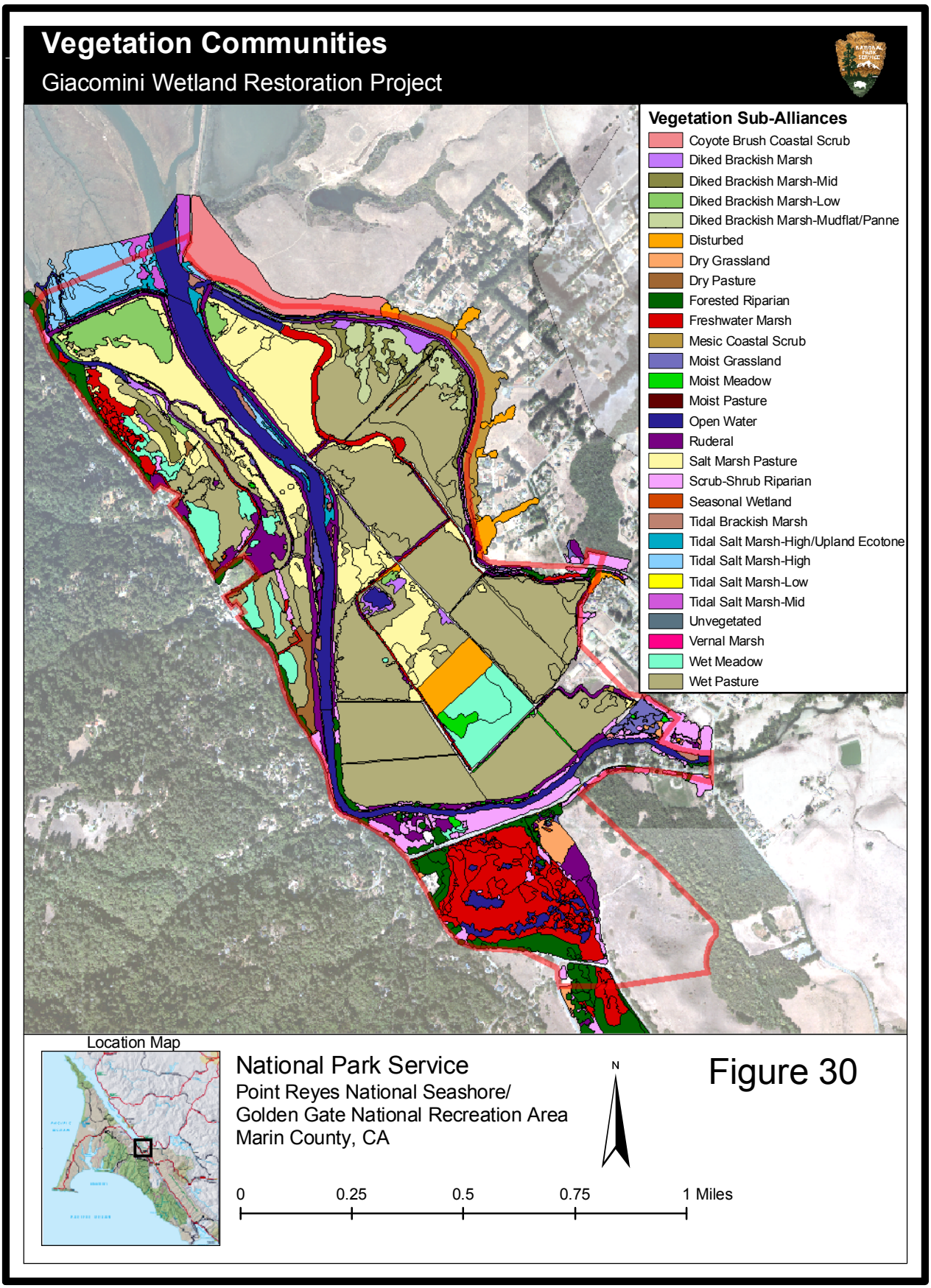

Vegetation Communities
Giacomini Wetland Restoration Project
Vegetation Sub-Alliances
Coyote Brush Coastal Scrub
Diked Brackish Marsh
Diked Brackish Marsh-Mid
Diked Brackish Marsh-Low
Diked Brackish Marsh-Mudflat/Panne
Disturbed
Dry Grassland
Dry Pasture
Forested Riparian
Freshwater Marsh
Mesic Coastal Scrub
Moist Grassland
Moist Meadow
Moist Pasture
Open Water
Ruderal
Salt Marsh Pasture
Scrub-Shrub Riparian
Seasonal Wetland
Tidal Brackish Marsh
Tidal Salt Marsh-High/Upland Ecotone
Tidal Salt Marsh-High
Tidal Salt Marsh-Low
Tidal Salt Marsh-Mid
Unvegetated
Vernal Marsh
Wet Meadow
Wet Pasture
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 30

TABLE 11. ACREAGES OF THE MOST DOMINANT VEGETATION COMMUNITIES MAPPED IN THE PROJECT AREA

		Giacomini		Olema Marsh		TOTAL	
		Acres	%	Acres	%	Acres	%
1.	Wet Pasture	209.6	38.1	0	0.0	209.6	34.2
2.	Salt Marsh Pasture	87.5	15.9	0	0.0	87.5	14.3
3.	Ruderal	54.3	9.9	0.2	0.3	54.5	8.9
4.	Open Water	45.5	8.3	5.5	8.7	51.0	8.3
5.	Freshwater Marsh	14.3	2.6	36.3	57.6	50.6	8.3
6.	Forested Riparian	17.2	3.1	13.6	21.6	30.8	5.0
7.	Wet Meadow	22.6	4.1	0.3	0.5	22.9	3.7
8.	Tidal Salt Marsh-Mid	20.6	3.7	0	0.0	20.6	3.4
9.	Diked Brackish Marsh-Low	15.04	2.7	0		15.0	2.5
10.	Diked Brackish Marsh-Mid	14.4	2.6	0	0.0	14.4	2.3
11.	Scrub-Shrub Riparian	11.3	2.1	2.3	3.7	13.6	2.2
12.	Mesic Coastal Scrub	12.4	2.3	0	0.0	12.4	2.0
13.	Diked Brackish Marsh-Mudflat/Panne	12.3	2.2	0	0.0	12.3	2.0
14.	Diked Brackish Marsh-High	9.1	1.7	0	0.0	9.1	1.5

Riparian communities east of the East Pasture and Tomasini Creek (Parsons and Allen 2004b).

Brackish marsh vegetation communities are also diverse in general, but Tidal Brackish Marsh habitats often consist of extensive stands of tall emergent plant species along the upper reaches of Lagunitas Creek (Parsons and Allen 2004b). Diked Brackish Marsh and Tidal Salt Marsh communities are comprised of varying mixtures of salt marsh species. Within the Giacomini Ranch, Diked Brackish Marsh occurred in low-lying areas or depressions that were formerly tidal channel sloughs (Parsons and Allen 2004b; Figure 30). Prolonged ponding in diked areas that are tidally influenced either directly or indirectly has either precluded or minimized vegetation establishment, creating Mudflat/Panne communities (Parsons and Allen 2004b). Tidal Salt Marsh-Mid communities -- or salt-adapted vegetation communities that typically occur at middle intertidal elevations in salt marshes that are inundated frequently by tides -- occurred on the outer perimeter of the Giacomini Ranch levees and in the undiked marsh north of the Ranch, while Lagunitas Creek accounted for most of the Open Water habitat (Figure 30).

The number of plant associations within most of the vegetation communities is relatively diverse, ranging from only one to as many as 10 associations or groups of plant species (Parsons and Allen 2004b, Ryan and Parsons, *in prep*.). Plant associations represent groupings of particular plant species that commonly occur together, and a particular vegetation community might be composed of several different distinct plant associations. A more detailed description of the dominant vegetation communities and their plant associations is provided below.

While not all non-native plant species are invasive and/or are documented to have negative effects on native plant species communities or wildlife habitats, vegetation communities and plant associations dominated by natives are considered to be more "intact" and likely to support to wildlife through providing habitat, food, and

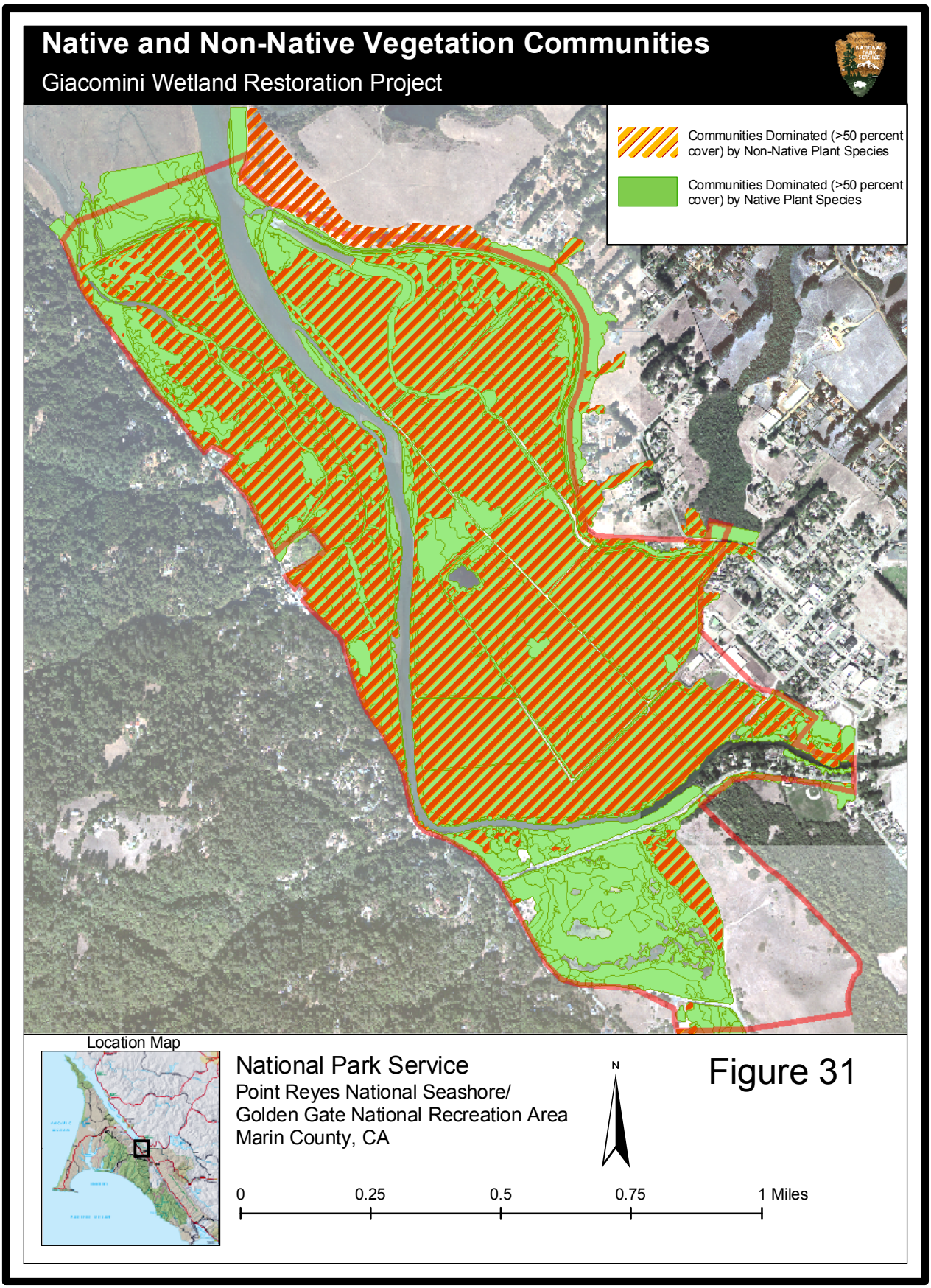
other important relationships, some of which may yet to be documented through existing research. The documented or potential importance of vegetation communities and plant associations dominated by native plant species is one of the reasons that some wetland functionality assessment methodologies include native vegetation communities. Many of the dominant plant associations in the Project Area are dominated or co-dominated by non-native species, some of which were introduced as forage species. Others are aggressive ruderal species that invade areas that are highly disturbed. Dominance and co-dominance are loosely based on definitions in the Seashore vegetation mapping methodology, with native communities considered those with relative cover less than 30 percent (Schirokauer and Parravano 2003). Native species are defined using criteria in the California Invasive Plant Council and/or Jepson Manual (1993) regarding the origin of species (e.g., native, non-native, or naturalized). In general, saline environments tend to support less non-native species, because they are incapable of tolerating highly saline conditions. Brackish vegetation communities and plant associations show a higher proportion of non-native species, however, the number is still limited relative to freshwater environments because of the higher salinities. Common non-native brackish marsh species include brass buttons (*Cotula coronpifolia*) and annual beard grass (*Polypogon monspeliensis*). Because of its history of disturbance and management, the Giacomini Ranch is largely dominated by non-native species, with 467 of the 613 acres present in the ranch and Olema Marsh dominated by non-native species (Figure 31). Despite its history of management and disturbance, Olema Marsh is almost completely dominated by native species, although some non-native species occur in the riparian understory (Figure 31).

Freshwater Vegetation Communities

The historical extent of glycophytic or freshwater vegetation communities within the Tomales Bay watershed is unknown (Parsons and Allen 2004b). The numerous perennial freshwater drainages and sources of groundwater flow present in this region strongly suggest that extensive freshwater habitat occurred in this portion of the Tomales Bay watershed historically (Parsons and Allen 2004b). Groundwater, combined with freshwater drainages flowing off the Inverness and Bolinas Ridges, may have led to formation of extensive freshwater habitat in the Olema Valley upstream of tidal influence, particularly prior to European settlement. The interface between fresh and saline influences was probably even more dramatic historically in southern Tomales Bay, fostered by the combination of fluvial input from several major drainages (Lagunitas, Olema), small drainages (Tomasini, Fish Hatchery, etc.), and seep flow from the Inverness Ridge and Point Reyes Mesa (Parsons and Allen 2004b). The 1863 U.S. Coast Survey maps portray the southern end of Tomales Bay as open water and intertidal mudflat with marsh in the southeastern end in what is today the Giacomini Ranch East Pasture, Olema Marsh, and Olema Creek floodplain. Some historical accounts refer to "Arroyo Olemus Lake" or Olema Lake, which most likely occurred along the low-lying floodplains of Olema Creek between the town of Olema and Lagunitas Creek (Niemi and Hall 1996). This "lake" may have been subsequently drained by construction of the Olema Canal, which straightened the section of Olema Creek between Olema and Lagunitas Creek (Niemi and Hall 1996).

However, at least within the Project Area, it is likely that the extent of freshwater habitat was historically lower than it is today (Parsons and Allen 2004b). While Olema Lake was probably freshwater marsh, tidal marsh appears to have extended into Olema Marsh (Parsons and Allen 2004b), with tidal influence during extreme events reaching Park administrative headquarters (Evens 1993). This suggests that Olema Marsh, which Thomas Howell (1970) once described as "perhaps the best freshwater marsh in (Marin) County," is probably an artifact of levee construction during the late 1800s along Sir Francis Drake Boulevard, also known as Levee Road. Bear Valley Creek flows through the Olema Marsh and then empties into Lagunitas Creek through two culverted drainages just upstream of White House Pool. This marsh, considered the most extensive in Marin County, supports the county's largest red alder (*Alnus rubra*)-willow (*Salix* spp.) stand, which grows alongside substantial patches of cattails (*Typha* spp.) and sedges (*Carex* spp., *Scirpus* or *Schoenoplectus* spp.) (Shuford and Timossi 1989). As Evens (1993) noted, "by restricting tidal influence, man isolated fresh water from

Wet Pasture in the East Pasture, looking north


Native and Non-Native Vegetation Communities
Giacomini Wetland Restoration Project
Communities Dominated (>50 percent cover) by Non-Native Plant Species
Communities Dominated (>50 percent cover) by Native Plant Species
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 31

salt and created freshwater habitats ... where brackish marsh must have existed before."

Within the Giacomini Ranch, an artificially fresh regime has been reinforced, at least within the Project Area, by diking of Lagunitas Creek and minimization of tidal inflow into the pasturelands through one-way tidegates. Freshwater influences have been augmented by spray and flood irrigation in the East Pasture and possible enhancement of groundwater flow from Inverness Ridge and Point Reyes Mesa by septic discharges. The extensive freshwater marsh that exists in the northern portion of the West Pasture today is not even visible in the 1942 aerial photograph taken before the area was diked, suggesting that freshwater marsh conditions have been strongly promoted by the levee and possibly septic influences from houses on the Inverness Ridge.

Wet Pasture *(Parsons and Allen 2004b)*: A large percentage (38 percent or 210 acres) of the Giacomini Ranch has been mapped as Wet Pasture, particularly the southern and eastern portions of the East Pasture (Table 11; Figure 30; Parsons and Allen 2004b). Wet Pasture is a glycophytic grassland community dominated (> 50 percent) by grasses and herbs that are predominantly facultative or obligate hydrophytes or wetland species.Freshwater hydrologic sources for this community include bank overflow from small drainages, surface or subsurface movement of groundwater "seep" flow, surface runoff, artificial flooding by spray or flood irrigation, and precipitation.

Wet Pasture areas are either actively managed as pasture through seeding, irrigation, mowing, leveling, etc., or contain some of the predominant pastoral or forage species such as creeping bent grass (*Agrostis stolonifera*), rough bluegrass (*Poa palustris*), white clover (*Trifolium repens*), and strawberry clover (*Trifolium fragiferum*). Other non-native grass species present included Mediterranean barley (*Hordeum marinum*), perennial ryegrass (*Lolium perenne*), annual ryegrass (*Lolium multiflorum*), and tall fescue (*Festuca arundinacea*). Some native plant species occurred, as well, such as meadow barley (*Hordeum brachyantherum*), water foxtail (*Alopecurus geniculatus*), meadow foxtail (*Alopecurus pratensis*), western mannagrass (*Glyceria occidentalis*), and blue wildrye (*Leymus triticoides*).

Freshwater Marsh *(Parsons and Allen 2004b)*: The minimization of tidal flow through levees and tidegates, combined with strong freshwater influences from drainages, seeps, and irrigation, has encouraged establishment of Freshwater Marsh in some portions of the Project Area. Freshwater Marsh is characterized as freshwater areas dominated by more than 70 percent of persistent sedges, rushes, and other non-clover herbs that are inundated or saturated nearly year-round. Most of the freshwater marshes within the Project Area have developed in slow-moving drainages, drainage ditches, and ponds that have been highly disturbed by cattle or other agricultural activities. The size of this vegetation community is relatively small in the Giacomini Ranch, totaling only 14 acres or 3 percent of this portion of the Project Area. Conversely, this was the dominant community in Olema Marsh and lower Bear Valley Creek, representing 36 acres and 58 percent of this portion of the Project Area.

The large freshwater marsh in the northern portion of the West Pasture is a large (~7.2-acre) seep– and drainage-fed marsh dominated by tall emergent freshwater marsh species such as bulrush (*Scirpus* or *Schoenoplectus californicus*), cattails (*Typha spp.),* bur-reed (*Sparganium erectum* var. *stoloniferum*), rush (*Scirpus* or *Schoenoplectus americanus*), as well as low-growing species such as rush (*Juncus balticus* and J. *phaeocephalus*), hydrocotyle, water parsley, creeping bent grass (*Agrostis stolonifera*), western mannagrass, and sedges (*Scirpus* or *Schoenoplectus pungens* and *S. microcarpus*). The tall emergent species such as cattails, bulrush, bur-reed, etc., typically occur in dense, almost monotypic clumps that are spatially separated from each other by a dense blanket of low-growing emergent species such as hydrocotyle, water parsley, and sedge (*Scirpus* or *Schoenoplectus pungens*). Hydrologic conditions are maintained by small perennial drainages that flow onto the gradually sloped surface from the south and west (under Sir Francis Drake Boulevard) and groundwater from the Inverness Ridge, as well as occasional tidal flooding.

Clumps of tall emergents such as cattails and bulrush occur amidst a blanket of low-growing species such as hydrocotyle and water parsley in the West Pasture's Freshwater Marsh

The largest freshwater marsh in the Project Area is Olema Marsh (Ryan and Parsons, *in prep*.). Olema Marsh, once described as "perhaps the best freshwater marsh in the county" (Howell 1970), is dominated by tall emergent monocots, such as cattails (*Typha latifolia* and *angustifolia*), bulrush, hardstem bulrush (*Scirpus* or *Schoenoplectus acutus*), and sedges (*Scirpus* or *Schoenoplectus microcarpus*), with lesser amounts of low-growing species such as rush, hydrocotyle and water parsley. Lower Bear Valley Creek is also largely freshwater marsh habitat due to its flat gradient, but with a higher percentage cover of floating or low-growing plant species (Ryan and Parsons, *in prep*.). Marsh conditions were once maintained through annual burning of willows by the Bear Valley Country Club (Evens 1993). The freshwater marsh habitat in Olema Marsh and lower Bear Valley Creeks is sustained by perennial creek flow from Bear Valley Creek, as well as seasonal and perennial flow from drainages and groundwater originating from the Inverness Ridge (KHE 2006a). The culverts at Levee and Bear Valley Roads, in addition to remnants of historic fill activities near Levee Road, have largely precluded tidal influence in these once tidal areas and may be negatively impacting riparian habitat along the perimeter through impoundment of waters and steadily increasing water surface levels (KHE 2006b, Ryan and Parsons, *in prep*.).

Wet Meadow *(Parsons and Allen 2004b)*: Wet Meadows support at least 30 percent cover of sedge, rush, or other non-clover herbs, as well as grasses. Typically, dominant sedge and rush species are the short- to medium-sized species, as opposed to cattails, tules, and bulrush. Species include freshwater and/or brackish ones such as spikerush (*Eleocharis macrostachya*), hydrocotyle, rush (*Juncus balticus*, *J. effusus*, and *J. lesueurii*), pennyroyal (*Mentha pulegium*), white clover (*Trifolium repens*), water foxtail, western mannagrass, creeping bent grass (*Agrostis stolonifera*), and perennial ryegrass, as well as occasionally sedge (*Scirpus* or *Schoenoplectus microcarpus*), monkeyflower (*Mimulus guttatus*), and water cress (*Rorippa nasturtium-aquaticum*). Inundation or saturation with water often extends throughout the spring into at least the early summer. Wet Meadow habitat occurs principally in the West Pasture along the sloped perimeter of the Inverness Ridge where groundwater emerges from the base of the Inverness Ridge and sheetflows across or just below the soil surface. In terms of area, Wet Meadow habitat represents a moderately large proportion of the Project Area (3.5 percent), with area totaling 23 acres.

Scrub-Shrub and Forested Riparian *(Parsons and Allen 2004b)***:** Scrub-shrub and Forested Riparian communities primarily occur along the western boundary of the West Pasture, the southern portion of Lagunitas Creek; Wildlife Conservation Board lands near White House Pool and the Green Bridge; lower Bear Valley Creek; the perimeter of Olema Marsh; and along limited portions of Tomasini and Fish Hatchery Creeks and other small drainages. Most of these riparian communities are hydrologically influenced by headwater or backwater freshwater flooding along creeks and/or tidal flooding in brackish portions of creeks. However, in response to strong groundwater gradients from either the Inverness Ridge or the Point Reyes Mesa, a riparian fringe has established along the western and eastern perimeters of the Giacomini Ranch and the western perimeter of Olema Marsh also receives groundwater flow from either Inverness Ridge or the Point Reyes Mesa.

Forested Riparian habitat consisting of mature red alder and arroyo willow stands along northern portion of Fish Hatchery Creek adjacent to Sir Francis Drake Boulevard

Within the Project Area, the riparian vegetation communities generally reflected the low stream and valley slope gradient present with red alder and arroyo willow the dominant species. Other species present are box elder, California buckeye (*Aesculus californicus*), eucalyptus (*Eucalyptus globulus*), California bay (*Umbellularia californica*), coast live oak (*Quercus agrifolia*), and shining willow (*Salix lucida* ssp. *lasiandra*). Dominant understory species included California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), stinging nettle (*Urtica dioica*), and horsetail (*Equisetum* spp.). In addition to eucalyptus, a few potential invasive species were also observed such as Himalayan blackberry (*Rubus discolor*), greater periwinkle (*Vinca major*), and Cape ivy (*Delairea odorata*), although the total percent cover of these species was very low, and they were relegated for the most part to the riparian strip along Sir Francis Drake that adjoins the Inverness Park residential area.

Grazing has eliminated riparian habitat along most of the drainages within the pastures themselves, although some sapling-sized arroyo willows (*Salix lasiolepis*) and red alders (*Alnus rubra*) are trying to establish at the southern end of Fish Hatchery Creek. In addition to agricultural impacts, riparian habitat along Lagunitas Creek may be affected by upstream hydrologic alterations such as dams, mining, and groundwater withdrawal. By decreasing the magnitude of peak flows, increasing the duration of bankfull or ordinary high water flows, and trapping sediment, dams can alter the dynamics of riparian communities dramatically by decreasing opportunities for recruitment of tree species through flood scour or increasing bank erosion and loss of habitat (Johnson et al. 1976; Bradley and Smith. 1986; Rood and Mahoney 1990; Stromberg et al. 1993; Friedman et al. 1998) . Rising water levels within Olema Marsh – which was once burned annually to eliminate willows for the hunting club (Evens 1993) –currently appear to be causing a dieback of riparian vegetation along the perimeter of the marsh.

Despite elimination of riparian habitat through development, grazing, or agricultural practices, acreage of Scrub-Shrub Riparian habitat (tree canopy <66 feet in height) in the Giacomini Ranch still totaled 11 acres, while that of Forested Riparian habitat (tree canopy > 66 feet in height) totaled 17 acres, representing approximately 2 and 3 percent of this portion of the Project Area, respectively. In Olema Marsh and lower Bear Valley Creek, acreage of Forested Riparian habitat (14 acres) substantially exceeded that of Scrub-Shrub Riparian habitat (2 acres), representing 22 and 4 percent of this portion of the Project Area, respectively.

Brackish Vegetation Communities

While the extent of brackish marsh within the San Francisco Bay Estuary is considerable due to significant natural and anthropogenic freshwater sources such as the Sacramento River and wastewater treatment discharges (Baye et al. 2000), brackish marsh is not as common within central California coast's maritime systems. The central coastal marshes tend to be isolated and few because of the steep modern shoreline with few valleys or wave-sheltered environments (Baye et al. 2000). Those that do exist typically have extensive sandy substrates; relatively small, local inputs of fine sediment and freshwater discharges, and are inundated with water approaching marine salinity (34 ppt) during most of the growing season (Baye et al. 2000).

The historic extent of brackish vegetation communities was probably highest in the southern portions of Tomales Bay, as tidal influence decreased, and freshwater influences from tributaries and groundwater increased (Parsons and Allen 2004b). The combination of significant freshwater fluvial input, as well as groundwater flow along the adjacent ridges and mesas, points to southern Tomales Bay being both historically and currently a sizeable mixing zone characterized by consistently brackish to slightly saline conditions. Brackish marsh species such as bulrush (*Scirpus* or *Schoenoplectus californicus*), cattails (*Typha* sp.), and alkali bulrush (*Scirpus* or *Schoenoplectus maritimus*) are visible in 1942 photographs shot immediately before levee construction as patches scattered throughout what is currently the East Pasture, along Tomasini Creek, and near Railroad Point or at the base of the Tomales Bay Trail (PWA et al. 1993). To some degree, this interface "zone" of brackish water habitat probably shifted geographically on an annual basis due to interannual and long-term climatic variability, however, longer term changes in hydrologic regimes, probably on decadal scales, would be required for conversion of vegetation communities (Parsons and Allen 2004b).

Tidal Brackish Marsh on Lagunitas Creek

In general, brackish marsh habitat within Tomales Bay has been negatively affected by construction of roads, berms, and levees that have eliminated this interface zone and created sharp demarcations between glycophytic and halophytic hydrologic regimes (Evens 1993). To some degree, this brackish hydrologic regime has endured in the Project Area despite diking, minimization of tidal flows, and augmentation of freshwater influences by irrigation, septic, etc., because of failure of the tidal control structures and a strong groundwater interaction between Lagunitas Creek and the slightly subsided Project Area (Parsons and Allen 2004b). However, a number of factors -- including possibly concentration of salts within brackish waters through evapotranspiration and agricultural-related manipulation of the land and grasses -- has managed to minimize the number and extent of "true" brackish vegetation communities

relative to glycophytic and halophytic ones (Parsons and Allen 2004b).

Tidal Brackish Marsh *(Parsons and Allen 2004b)*: Tidal Brackish Marsh occurs exclusively along sections of Lagunitas Creek where water salinities typically average in the brackish or mesohaline range (5-18 ppt). Tidal Brackish Marsh communities are outside of levees and berms and experience a full range of tidal and freshwater inputs. The extent of this vegetation community remains minimal within the Project Area (<1 percent or 4.8 acres) due to the fact that the Giacomini Ranch levees have infringed upon the intertidal zone where brackish marsh (and Tidal Salt Marsh-Low) would typically develop. The habitat that does exist consists of a thin fringe of either pure or mixed communities of bulrush or alkali bulrush. Occasionally, other species such as Pacific cordgrass (*Spartina foliosa*), pickleweed, or cattails are present, but only in very low numbers.

Diked Brackish Marsh *(Parsons and Allen 2004b)*: Diked Brackish Marsh is dominated (>70 percent) by hydrophytic non-clover herbs that are able to tolerate water salinities that average in the brackish or mesohaline range (5-18 ppt). Diked communities are inside of levees or berms and experience typically only muted tidal action, if any. Principal tidal hydrologic sources include muted tidal flow from creeks such as Fish Hatchery and Tomasini that are managed with tidal control structures and, within non-tidal areas, interaction with a saline groundwater table. In addition, these areas are probably also heavily influenced by perennial and seasonal headwaters flooding and seep flow from Inverness Ridge and Point Reyes Mesa, etc. Diked Brackish Marsh often strongly resembles salt marsh communities, but salinities are lower due to the impounded freshwater. Diked Brackish Marsh covers a significant expanse of the very northern portion of the West Pasture, as well as some of the depressional slough traces still evident in this pasture. In the East Pasture, Diked Brackish Marsh is confined to the very northern edges of the East Pasture and around the New Duck Pond, where neither spray or flood irrigation is actively performed. This community is represented by a diverse mix of low-growing, medium-sized, and tall emergent plant species, including freshwater/brackish and saltwater species such as spearscale (*Atriplex triangularis*), pickleweed (*Salicornia* or *Sarcocornia virginica*), jaumea (*Jaumea carnosa*), saltgrass (*Distichls spicata*), annual beard grass (*Polypogon monspeliensis*), saltgrass (*Distichlis spicata*), perennial ryegrass (*Lolium perenne*), hydrocotyle (*Hydrocotyle ranunculoides*), bulrush, rush (*Juncus effusus*), bur-reed (*Sparganium erectum var. stoloniferum*), and cattails. Diked Brackish Marsh represents more than 6 percent of the Project Area, totaling approximately 36 acres.

Diked Brackish Marsh along Fish Hatchery Creek in West Pasture

Diked Brackish Marsh (Mudflat/Panne) *(Parsons and Allen 2004b)*: The lowest elevation portion of the East Pasture often floods for a significant period during the winter and spring, which results in sparsely vegetated mudflats that provide habitat for a surprising number of shorebirds and waterfowl during the rainy season. When waters evaporate, a very low-growing, sparse cover of halophytes typically develops in this Mudflat/Panne habitat, consisting of species such as sand-spurrey (*Spergularia rubra*), spearscale, and, to a much lesser extent, saltgrass. This community comprises 1.6 percent (Diked Brackish Marsh-Mudflat/Panne; 11.4 acres).

Saltwater Vegetation Communities

Unlike its large neighbor to the south, the Tomales Bay estuary did not appear to have historically the extensive network of fringing salt marshes that were once present in San Francisco Bay (Parsons and Allen 2004b). U.S. Coast Survey maps from the 1860s and 1870s depict small amounts of marsh habitat along the edges of Tomales Bay, with the largest extent in the southern portion of Tomales Bay in what are currently the East Pasture, Olema Marsh, and the Bear Valley and Olema Creek floodplains (Parsons and Allen 2004b). The existing undiked marsh currently north of Giacomini Ranch appeared to be largely unvegetated or sparsely vegetated subtidal and intertidal mudflats (Parsons and Allen 2004b). Walker Creek Marsh, one of Tomales Bay's other large undiked marshes, does not even exist in the Coast Survey maps, with the marsh area shown as subtidal area and intertidal flats (Parsons and Allen 2004b).

The dramatic increase in sedimentation associated with logging and agricultural development (see more

detailed discussion under Geologic Resources) had the inadvertent effect of also dramatically increasing deltaic aggradation at the mouths of creeks such as Lagunitas and Walker. Between 1860 and 2000, wetland acreage almost doubled due to this sedimentation (Parsons et al. 2004). Some of this sedimentation resulted in conversion from what appeared to be open estuarine systems with large embayments and little to no marsh habitat into salt marsh estuaries with significant marsh plain and tidal channels (Parsons et al. 2004). Deltaic marsh formed at the mouth of not only Lagunitas Creek, but also Walker Creek, which are the watershed's two largest subwatersheds and potentially the drainages with the highest sedimentation rates (Parsons et al. 2004).

While sedimentation likely increased coastal salt marsh acreage, other changes counteracted this trend, specifically construction of levees for roads and railroad bridges and "reclamation" of wetlands for agricultural purposes. For example, construction of the levee along the southern portion of Sir Francis Drake Boulevard (Levee Road) to a large degree eliminated tidal influence upstream of White House Pool. Many of the marshes on the Bay's eastern shore were impacted to some degree by construction of levees, Highway 1, and the railroad, although some have at least partially breached.

Another significant factor influencing the formation and character of Tomales Bay's salt marshes is its geology, specifically the fact that San Andreas Fault runs directly down the center of the Bay. Following the 1906 earthquake, USGS geologist G.K. Gilbert surveyed conditions in the Olema and Bolinas areas, documenting sags, trenches, landslides, and other features along the fault trace, reporting some localized losses of salt marsh (Gilbert 1908).

Structure of the deltaic marshes that developed as a result of sedimentation does not necessarily follow the classic paradigm for salt marshes, which portrays a subtle elevational gradient from "low marsh" adjacent to creeks, building gradually to a mid-marsh plain that transitions into a "high marsh" zone at the marshes' highest elevations near the upland ecotone. Wetlands at the mouth of Lagunitas and Walker creeks often support only a thin fringe of "low marsh" along the narrow intertidal creek banks that rise sharply to natural alluvial levees and then transition to broad expansive marsh plains that taper to mudflat at their bayward edge. Subtle elevational transitions between marsh plain and Bay are present more in fringing marshes along the western shore of Tomales Bay. But even in these areas, the transitional upland ecotone is often replaced by a freshwater wetland ecotone fostered by extensive groundwater influences along the perimeter of the Bay. Another noteworthy difference was the conspicuous absence in Tomales Bay for many decades of Pacific cordgrass (*Spartina foliosa*; (MacDonald 1974), although abundance of this species has surged dramatically since first being observed in the 1990s, primarily through colonization of the Lagunitas Creek delta mudflats (Parsons and Allen 2004b).

Salt Marsh Pasture *(Parsons and Allen 2004b)*: Muted tidal inflow, as well as the strong, apparent groundwater connectivity between Lagunitas Creek and the Project Area, has led to establishment of several halophytic plant communities within lower elevation portions of the pastures such as Diked Salt Marsh and Salt Marsh Pasture. Salt Marsh Pasture is characterized by a significant presence (at least 20 to 25 percent) of halophytic herbs and forbs in areas with glycophytic grasses, herbs, and pastoral species such as creeping bent grass (*Agrostis stolonifera*) or rough bluegrass (*Poa trivialis*). Halophytes or salt tolerant species include saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), pickleweed (*Salicornia* or *Sarcocornia virginica*), spearscale (*Atriplex triangularis*), birdfoot trefoil (*Lotus corniculatus*), etc. Salt Marsh Pasture dominated most of the northern portion of the West Pasture and some of the very northern portions of the East Pasture. In total, it represented a substantial proportion (16 percent) of the Giacomini Ranch portion of the Project Area, with 87.5 acres.

Tidal Salt Marsh-Mid and Tidal Salt Marsh-High in undiked marsh north of Giacomini Ranch

Tidal Salt Marsh – Low, Mid, High, and High Marsh/Upland Ecotone *(Parsons and Allen 2004b)*: Tidal Salt Marsh occurs in the large expanse of undiked deltaic marsh north of the Giacomini Ranch, as well as on central bars/"islands" in Lagunitas Creek, and the fringe marsh along the outboard portion of the Lagunitas Creek levee. These salt marshes are subject to both

direct tidal and freshwater influences, including headwaters flooding and high tide events. Tidal Salt Marsh-Mid accounted for approximately 4 percent of the Project Area, totaling approximately 21 acres, most of which occurs on the outboard of levees and in the undiked marsh north of Giacomini Ranch.

Deltaic and fringe marshes typically support a thin fringe of low marsh along the banks of tidal marsh channels and creeks characterized by species such as Pacific cordgrass, alkali bulrush (*Scirpus* or *Schoenoplectus maritimus*), and pickleweed. The alluvial levees running along larger creeks such as Lagunitas support a "high marsh/upland ecotone" vegetation community with species such high marsh species such as saltgrass, alkali heath, and gumplant (*Grindelia* sp.) mixed with upland species such as red fescue (*Festuca rubra*).

Inland of these alluvial levees lie broad, expansive marsh plains supporting interspersed pockets of very low-growing mid-marsh and high-marsh species assemblages, as well as small, typically unvegetated marsh ponds. Mid- and lower elevation high-marsh zones are dominated by jaumea, saltgrass, seaside arrow-grass (*Trigochlin maritima*), arrow-grass (*Triglochin concinna*), and western marsh rosemary (*Limonium californicum*). During the summer, the presence of purple-flowered western marsh rosemary easily distinguishes lower-elevation high marsh in deltaic marshes. Alluvial fan-tidal ecotones support distinctive local plant assemblages, including uncommon and rare species such as Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*; FSC), Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*; FSC), and, to a much lesser extent, Marin knotweed (*Polygonum marinense*; FSC; Baye et al. 2000; Parsons 2003). These species are discussed in greater detail later in this section.

Other

The Project Area also includes a number of other habitats not directly classifiable by specific hydrologic regimes. Many of these are upland communities and/or represent a minor component within the Project Area.

Mesic Coastal Scrub *(Parsons and Allen 2004b)*: Even some of the limited coastal scrub habitat present in the Project Area incorporates a mesic or moist component, with perennial or seasonal seep flow on the Point Reyes Mesa creating a unique vegetation community characterized by both arroyo willow (*Salix lasiolepis*) and coyote brush (*Baccharis pilularis*). In general, this community is dominated by a dense canopy of low shrubs or trees, but with scattered grassy or ruderal openings. Willow grows in combination with coyote brush, poison hemlock (*Conium maculatum*), poison oak (*Toxicodendron diversilobum*), and even coast live oak (*Quercus agrifolia*). Natural seep influences may be augmented to some degree by septic systems from residential areas on Point Reyes Mesa, although this vegetation community is apparent in early 1940s aerial photographs that were taken prior to large-scale development on the Point Reyes Mesa. Groundwater influences appear to extend beyond the slope to Tomasini Creek, which has been bermed to contain flow along the base of Point Reyes Mesa. Acreage of Mesic Coastal Scrub was relatively high because it spans the face of the Point Reyes Mesa, totaling 12.4 acres or 2 percent of the Project Area.

Coastal Mesic Scrub on Point Reyes Mesa Bluff

Ruderal (*Parsons and Allen 2004b*): Ruderal communities represented a significant portion of the Project Area. Ruderal included areas supporting a mixture of herbs and forbs with often no clear or consistent dominance pattern. Most of the levees and berms within the Project Area, as well as the alluvial floodplain of Fish Hatchery Creek in the West Pasture, were mapped as Ruderal. A large proportion of the species within these polygons was non-native, but a significant amount of blue wildrye was also observed growing on the

levees. Hydrologic input to these communities consists of very infrequent overbank flooding and precipitation. Acreage totaled 54.5 acres or approximately 9 percent of the Project Area.

Vegetation Communities of Special Significance – Wetlands and Riparian Areas

While wetlands are included as vegetation resources, wetlands really represent a complex integration of geologic, hydrologic, and biological processes. Wetlands are probably often described as vegetation communities, probably because the unique vegetation that typically occurs in wetlands is the perhaps the most enduring and easily identifiable characteristic of these complex systems. However, it is the integration of these geologic, hydrologic, and biological processes that enables wetlands to provide the diverse number of hydrologic, ecological, and socioeconomic functions and "services" to wildlife and humans that they do. Some of the functions and services that wetlands provide – and that the proposed project is trying to restore – include water quality improvement, floodwater retention, and habitat for resident and non-resident wildlife. While other "vegetation communities" such as forests and grasslands obviously have intrinsic value, in terms of the number and degree of functions and services, wetlands and riparian habitats arguably offer the greatest benefit to the biological and social environment.

The beauty of California's relatively rugged coastline has encouraged extensive residential, commercial, and agricultural development, dramatically reducing acreage of coastal wetlands, particularly in southern and central California. Estimates for coastal wetland loss are as high as 95 percent. Despite these losses, California supports the most extensive coastal wetlands of any west coast state except Alaska (NOAA 1990). Total wetland acreage has been estimated at 3,800 acres for the outer central California coast stretching from Cape Mendocino in the north to Point Conception in the south, excluding San Francisco Bay (Dennis and Marcus 1984). Recent estimates of wetland acreage within Tomales Bay totaled 944.2 acres (Parsons et al. 2004), with Giacomini Ranch and Olema Marsh combined accounting for approximately 613 acres. Together, the Project Area wetlands represent approximately 16 percent of the remaining wetlands present along the outer central California coast.

The beauty of California's relatively rugged coastline has encouraged extensive residential, commercial, and agricultural development, dramatically reducing acreage of coastal wetlands, particularly in southern and central California

Regulatory and Policy Setting

The increasing awareness of the value and importance of wetland and riparian functions for both people and wildlife may represent one of the primary reasons that impacts to wetlands and their watersheds have become more closely regulated in recent decades. The U.S. Army Corps of Engineers (Corps) oversees Section 404 of the federal Clean Water Act and Section 10 of the federal Rivers and Harbors Act, both of which serve to ensure that impacts to navigable waters and special aquatic sites such as wetlands are minimized. In addition, wetlands are also regulated under other federal statutes, including Section 401 of the Clean Water Act and the federal Coastal Act, both of which are administered by state agencies – RWQCB and California Coastal Commission (CCC), respectively. The Gulf of the Farallones National Marine Sanctuary shoreward boundary follows the mean high tide line of Tomales Bay. The Farallones prohibits or otherwise regulates activities related to discharging or depositing any material or matter, constructing structures, drilling through the seabed, dredging or altering the seabed, or removing or damaging any historical or cultural resource (15 CFR, Chapter IX, Subpart H).

The Park Service also scrutinizes projects with the potential to impact wetlands in order to comply with an Executive Order that decrees that federal agencies should "...avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct and indirect support of new construction in wetlands wherever there is a practicable alternative..." In compliance with this Executive Order, the Park Service adopted a policy of "no net loss of wetlands," with a longer term goal of net

gain Service-wide. Implementation of this policy meant that, for new development or new activities, the Park Service pledged to avoid adverse wetland impacts to the extent practicable; minimize impacts that could not be avoided, and compensate for remaining unavoidable adverse impacts through restoration of degraded wetlands at a 1:1 ratio. Unlike Section 404 of the Clean Water Act, adverse impacts under Executive Order 11990 are not interpreted strictly as discharge of dredged or fill material, but encompass a much broader range of actions, including groundwater withdrawals, water diversions, nutrient enrichment, livestock grazing, pumping, flooding, and impounding.

These regulations and policies have seemingly increased the amount of confusion regarding how wetlands are defined. The confusion stems from the fact that jurisdiction or the amount and type of wetlands regulated under these statutes can vary between administrative agencies. While the RWQCB relies largely upon the Corps and its 1987 methodology to determine Section 401 jurisdiction, the CCC has taken a broader, more expansive interpretation of wetlands, and so has the Park Service. The net result is that there could be substantially more CCC- and Park Service- regulated wetlands than Corps-regulated wetlands within the same Project Area. Riparian zones often fall into one of these regulatory "gray" zones. Riparian zones can be defined as "wetlands" by the Corps if they remain wet enough to support hydrophytic or "water-loving" plant species and have soils that show indications of prolonged ponding or saturation. Typically, juvenile or young riparian stands often qualify as Corps' "wetlands" and then transition to non-jurisdictional wetlands as the elevation becomes higher through sediment deposition, and older plants become more capable of surviving through tapping into groundwater tables rather than relying on surface inundation or saturation. The CCC, however, might continue to classify them as wetlands based exclusively on the predominance of hydrophytic or water-loving plant species. Ultimately, these disparities in regulatory interpretation really reflect differences in the jurisdiction of these various state and federal agencies, not differences in the biological or ecological definition of wetlands.

Within the Project Area, the disparity between these jurisdictional boundaries was not substantial, probably due to the fact that, despite diking and its appearance as largely a grassy pasture, most of the Giacomini Ranch has remained "wetland" from a regulatory perspective. Generally, only the highest or most topographically elevated portions of the Ranch would be considered "upland," and, occasionally, even some of those areas were delineated as wetland due to the influence of seeps. For the purposes of complying with different federal, state, and local regulations and policies governing actions in wetlands, three wetland delineations using different delineation protocols were performed to determine areas subject to the jurisdiction or oversight of the Corps, RWQCB, CCC, CDFG, Park Service, and County and local agencies and organizations. The results of these delineations are described below.

Hydrogeomorphic Classification

Within the wetland regulatory and management community, there has been a strong push in recent years to classify wetlands not only according to vegetation type and structure such as freshwater marsh or salt marsh, but on hydrogeomorphology. Naturally, regional variations exist in the specific types of hydrogeomorphic features present, but most wetlands share some basic hydrologic and geomorphic attributes that enable them to be classified, on at least a basic level, by a methodology developed by Brinson (1993). The Project Area incorporates at least five different hydrogeomorphic classes of wetlands, including Estuarine Fringe; Slope Wetlands; Groundwater Slope Wetlands; Riverine Wetlands; and Organic Soil Flats. Because of the hydrologic complexity within the Project Area, a considerable amount of overlap occurs between these geomorphic classes.

Estuarine Fringe Wetlands are comprised of tidal wetlands in the undiked marsh north of the Giacomini Ranch, as well as the narrow fringe of undiked marsh on the outboard of the Giacomini Ranch levees and some of the islands or topographically elevated "central bars" in the middle of Lagunitas Creek. The entire Project Area could be classified as Riverine Wetlands, which include floodplains and riparian areas along rivers, creeks, and streams, although a large portion of the Riverine Wetlands for Lagunitas Creek and Tomasini Creek have been eliminated or minimized through levees that greatly reduce the amount of overbank flooding. Only Fish Hatchery Creek, Bear Valley Creek, and some of the small drainages flowing off the Inverness Ridge are hydrologically connected with their floodplains, although hydrologic functioning of these creeks has also been negatively impacted by culverts, road levees, ditching, and frequent dredging.

With levees reducing the amount of overbank flooding, most of the Giacomini Ranch could be classified as functioning more as Slope Wetlands, with surface runoff and precipitation generally sheetflowing from the higher-elevation southern portions of the two pastures towards the lower-elevation northern portions, where waters drain out either through one-way or modified one-way tidegates or over concrete spillways. Some of

the surface run-off derives from groundwater that emerges at the base of the Inverness Ridge or Point Reyes Mesa and flows into the two pastures. This abundant groundwater creates groundwater slope wetlands or, as they have been referred to in other areas of the country, "seepage toeslope" wetlands on the perimeter of both the West and East Pastures. In the West Pasture, the western perimeter is at a higher elevation than most of the rest of the pasture, encouraging sheetflow of this emergent groundwater into the center of the pasture, except where there are depressional basins such as in the extensive freshwater marsh along Sir Francis Drake Boulevard. The Point Reyes Mesa appears to support both seepage toeslope wetlands, as well as localized areas of hillside seepage slope wetlands, which manifest themselves as extensive arroyo willow forests or Mesic Coastal Scrub on the face of the Point Reyes Mesa bluff. In the East Pasture, the influence of these seeps creates more localized seepage toeslope features, because the perimeter elevation is flatter and more consistent with elevations in the center of the pasture.

Corps Jurisdiction

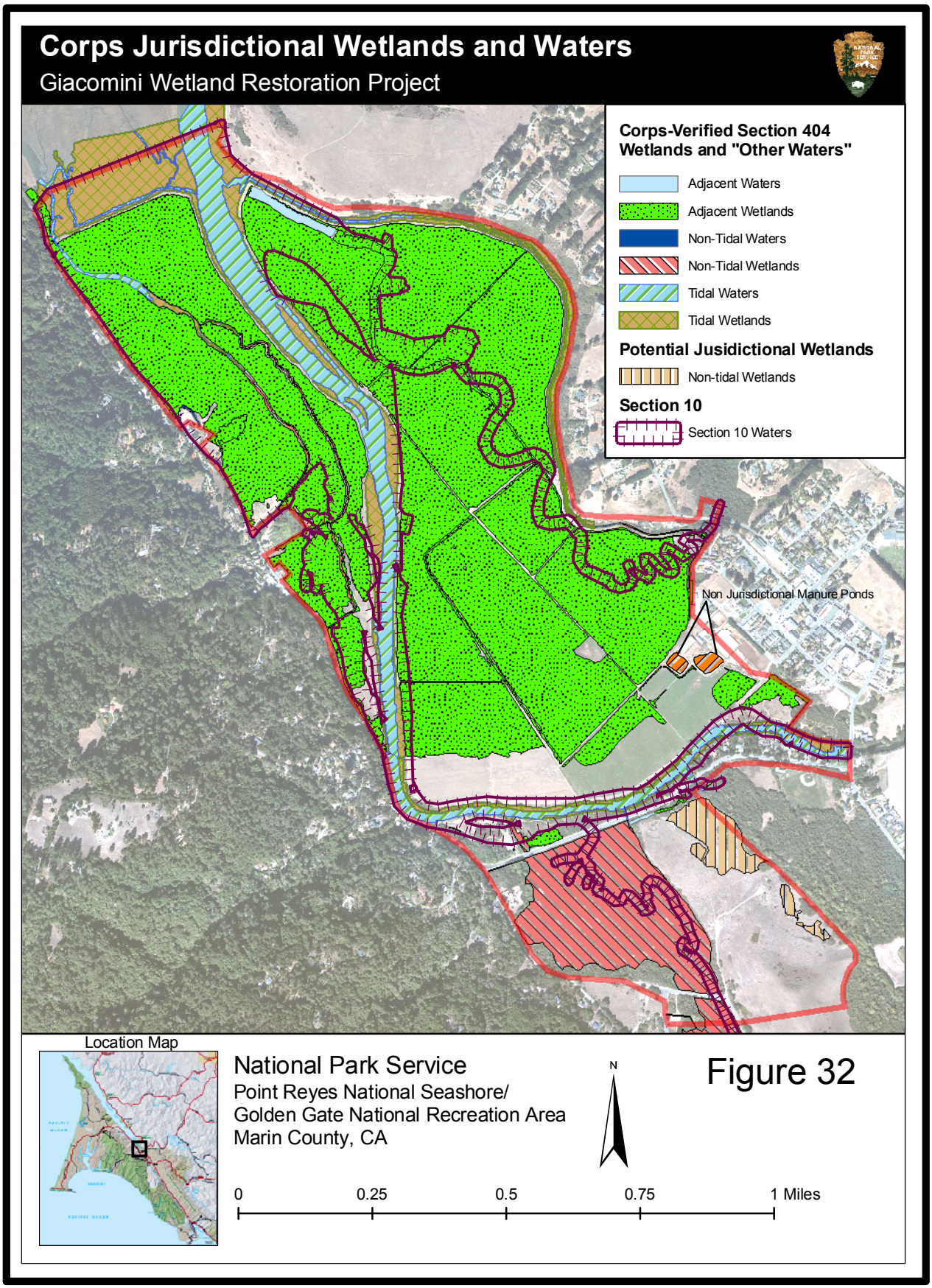
The Corps regulates several types of activities in waters of the United States, which includes navigable waters, tributaries to navigable waters, special aquatic sites (e.g., wetlands), and areas that are "adjacent" to navigable waters. These waters are regulated under Section 404 of the Clean Water Act (40 CFR Section 328.3) or Section 10 of the Rivers and Harbors Act (33 U.S.C. 403). A wetland delineation was performed by the Seashore and verified by the Corps in 2005 (Parsons 2005). A description of delineated wetlands is provided below, and acreages are provided in Table 12 (Parsons 2005). Based on this delineation, 536.6 acres of wetlands and waters subject to Section 404 jurisdiction under the Clean Water Act exist in the Project Area, with 249.3 of those acres also subject to Section 10 jurisdiction under the Rivers and Harbors Act (Figure 32; Parsons 2005)

Section 404 Jurisdictional Waters **(Parsons 2005).** Within the Project Area, jurisdictional tidal features were defined as wetlands and waters that fell below the High Tide Line (HTL), which was calculated as 8.06 ft NAVD88 (Figure 32). Jurisdictional tidal waters present in the Delineation Study Area consisted of unvegetated (<5 percent vegetation cover) areas below the High Tide Line (HTL) in Lagunitas Creek and the downstream portions of Tomasini, Fish Hatchery, Bear Valley, and Olema Creeks. Jurisdictional non-tidal waters consisted of unvegetated areas below the Ordinary High Water (OHW) elevation. Non-Tidal Waters were mapped in small portions of Fish Hatchery Creek, Tomasini Creek, 1906 drainage, and a small drainage near White House Pool. Potential jurisdictional Section 404 "adjacent" waters consisted of one small portion of a historic slough in the Giacomini Ranch East Pasture that has been hydrologically disconnected from Tomales Bay by the Lagunitas Creek levee.

Section 404 Jurisdictional Wetlands **(Parsons 2005).** Jurisdictional tidal wetlands were comprised of vegetated areas (>5 percent vegetation cover) below the HTL (Figure 32). Within the Project Area, tidal wetlands included the undiked marsh plain north of the Giacomini Ranch, fringing marsh along Lagunitas Creek, and fringing marsh along the downstream portions of Tomasini Creek and the Silver Hills drainage outlet. It also included diked portions of Fish Hatchery Creek in the northern portion of the West Pasture that are flooded during high tides. Jurisdictional Non-Tidal Wetlands consisted of vegetated areas (vegetation cover > 5 percent) below the OHW. Within the Project Area, Non-Tidal Wetlands included vegetated, upstream portions of Fish Hatchery Creek, the Old Slough in the Giacomini Ranch West Pasture, and Tomasini Creek. It also included most of Silver Hills drainage channel that flows parallel to Levee Road and is then culverted to flow through the White House Pool County Park. By far, the largest portion of Non-Tidal Wetlands occurred in Olema Marsh, which largely falls below OHW and is heavily vegetated.

Jurisdictional Section 404 "adjacent" wetlands represented most of the jurisdictional features delineated in the Project Area. "Adjacent" wetlands consisted of vegetated areas directly adjacent to Tidal and Non-Tidal Waters and Wetlands that could be considered connected either through hydrology (e.g., groundwater movement) or ecologically (e.g., movement of organisms). Specifically, these jurisdictional features included most of the wetlands in the Giacomini Ranch pasturelands and in County Park lands near White House Pool and the Green Bridge/dairy facility area. Potential jurisdictional Section 404 wetlands also occurred adjacent to Olema Creek and along one of the established access routes to the sediment disposal quarries on the Point Reyes Peninsula.

Section 10 Jurisdictional Waters **(Parsons 2005).** Jurisdictional Section 10 waters consisted of navigable waters either presently or historically subject to tidal influence that fall below Mean High Water (MHW; Table 12; Figure 32). In the Project Area, jurisdictional Section 10 waters included Lagunitas, Tomasini, Fish Hatchery, Bear Valley, and Olema Creeks. In addition, it included portions of the Giacomini Ranch, Olema


Corps Jurisdictional Wetlands and Waters
Giacomini Wetland Restoration Project
Corps-Verified Section 404 Wetlands and "Other Waters"
Adjacent Waters
Adjacent Wetlands
Non-Tidal Waters
Non-Tidal Wetlands
Tidal Waters
Tidal Wetlands
Potential Jusidictional Wetlands
Non-tidal Wetlands
Section 10
Section 10 Waters
Non Jurisdictional Manure Ponds
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 32

Marsh, and Olema Creek floodplains that were historically subtidal or intertidal and therefore below MHW before being diked or culverted/bridged.

TABLE 12. ACREAGES OF JURISDICTIONAL AND POTENTIAL JURISDICTIONAL SECTION 404 WETLANDS AND WATERS AND SECTION 10 WATERS

	Section 404 Waters			Section 404 Wetlands			Section 10
	Tidal	Non-Tidal	Adjacent	Tidal	Non-Tidal	Adjacent	Waters
Jurisdictional	43.88	0.36	1.93	54.99	49.85	385.63	249.28
Potential Jurisdictional			2.1				

Source: Parsons 2005

CCC Jurisdiction

Within California, the CCC administers the state program (California Coastal Act) for implementation of the federal Coastal Zone Management Act (CZMA). Any action by a federal agency such as the NPS requires a federal consistency determination by the CCC as required by CZMA. The CCC reviews all proposed wetland development projects within the California Coastal Zone. The Project Area falls within the Coastal Zone.

In the Coastal Zone, the CCC, with assistance from CDFG, is responsible for determining the presence and size of wetlands subject to regulation under the California Coastal Act (1976). The CCC has adopted the CDFG wetland definition and classification system, which is a modified version of the Cowardin classification system (Cowardin et al. 1979) in which an area needs only to meet one of the three parameters (hydrophytic vegetation, hydric soils or wetland hydrology) to qualify as a wetland (Radovich 1993). The Cowardin classification system is also the basis for the National Wetland Inventory (NWI) maps of wetlands and waters prepared by the USFWS for the entire United States. Because NWI is prepared from high-altitude aerial photography, mapped wetlands are typically those that are readily discernible in aerial photographs, such as perennially ponded marshes, stock ponds, lakes, and forested riparian areas along streams and drainages. It is less likely to incorporate seasonal or saturated wetlands that pond only seasonally or are primarily saturated through the growing season and support a low-growing emergent vegetation cover that is indistinct in aerial photographs from adjacent grasslands (e.g., wet meadows, flats, seeps, etc.)

Because hydrophytic vegetation is prevalent within the Seashore and coastal Marin County, the CCC wetland delineation was conducted as part of the vegetation mapping and Cowardin wetland classification effort that create and classified polygons with similar vegetation communities or plant associations (Parsons 2005). For this reason, areas that supported hydrophytic vegetation, but did not necessarily appear to have wetland hydrology, are incorporated into the CCC wetlands map, but are absent from the map of wetlands potentially subject to jurisdiction by the Corps (Parsons 2005) or management and oversight by the Park Service.

This delineation method yielded vastly different results than both the 1991 NWI map and Corps map. The 1991 NWI map identified only 17 wetland and aquatic habitat types in the Project Area, while approximately 225 different classifications of aquatic habitat were mapped by the Seashore (Parsons 2005). Based on the delineation, approximately 90 percent or 673.1 acres of the total Project Area qualified as a wetland potentially subject to CCC oversight (Figure 33; Parsons 2005). The Giacomini Ranch, adjacent undiked marsh, and County of Marin park areas near White House Pool and the Green Bridge account for 593.4 acres, with Olema Marsh area and the downstream portion of Bear Valley Creek (79.7 acres) comprise the remainder. Wetlands subject to potential oversight by the CCC along the established access routes to the sediment disposal quarries total approximately 0.1 acre. Because the CCC takes a broader interpretation of wetlands relative to its regulatory oversight, acreages of wetlands potentially subject to CCC jurisdiction are greater than that subject to Corps' jurisdiction. A substantial amount of these "drier" areas that did not qualify as Corps jurisdictional wetlands were riparian areas designated as wetland under the USFWS's new Riparian System code (see below for more detail). Table 13 presents an abbreviated list of the type and acreages of wetlands delineated within the Project Area that would appear to be potentially subject to oversight by the CCC. Below is a brief description of the Cowardin system and classes that were mapped within the Project Area.

***System/Subsytems* (Parsons 2005).** Because of its location at a major freshwater-estuarine confluence,

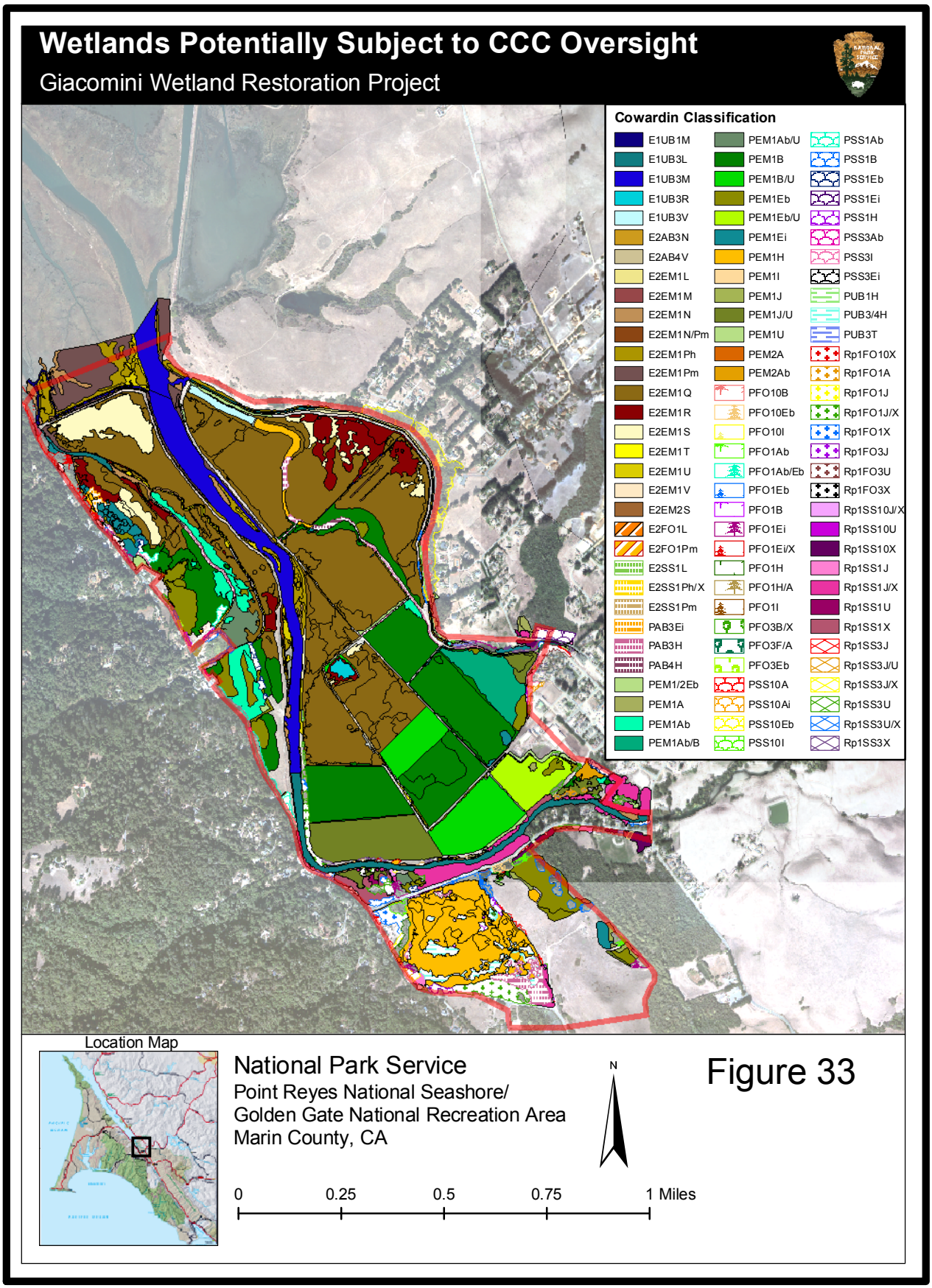

Wetlands Potentially Subject to CCC Oversight
Giacomini Wetland Restoration Project
Cowardin Classification
E1UB1M
E1UB3L
E1UB3M
E1UB3R
E1UB3V
E2AB3N
E2AB4V
E2EM1L
E2EM1M
E2EM1N
E2EM1N/Pm
E2EM1Ph
E2EM1Pm
E2EM1Q
E2EM1R
E2EM1S
E2EM1T
E2EM1U
E2EM1V
E2EM2S
E2FO1L
E2FO1Pm
E2SS1L
E2SS1Ph/X
E2SS1Pm
PAB3Ei
PAB3H
PAB4H
PEM1/2Eb
PEM1A
PEM1Ab
PEM1Ab/B
PEM1Ab/U
PEM1B
PEM1B/U
PEM1Eb
PEM1Eb/U
PEM1Ei
PEM1H
PEM1I
PEM1J
PEM1J/U
PEM1U
PEM2A
PEM2Ab
PFO10B
PFO10Eb
PFO10I
PFO1Ab
PFO1Ab/Eb
PFO1Eb
PFO1B
PFO1Ei
PFO1Ei/X
PFO1H
PFO1H/A
PFO1I
PFO3B/X
PFO3F/A
PFO3Eb
PSS10A
PSS10Ai
PSS10Eb
PSS10I
PSS1Ab
PSS1B
PSS1Eb
PSS1Ei
PSS1H
PSS3Ab
PSS3I
PSS3Ei
PUB1H
PUB3/4H
PUB3T
Rp1FO10X
Rp1FO1A
Rp1FO1J
Rp1FO1J/X
Rp1FO1X
Rp1FO3J
Rp1FO3U
Rp1FO3X
Rp1SS10J/X
Rp1SS10U
Rp1SS10X
Rp1SS1J
Rp1SS1J/X
Rp1SS1U
Rp1SS1X
Rp1SS3J
Rp1SS3J/U
Rp1SS3J/X
Rp1SS3U
Rp1SS3U/X
Rp1SS3X
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles
Figure 33

TABLE 13. ACREAGES OF COWARDIN SYSTEMS AND CLASSES IN THE GIACOMINI WETLAND RESTORATION PROJECT DELINEATION STUDY AREA

Wetland Code	Classification	Giacomini Ranch & SLC and County Park Lands (Acres)	Olema Marsh and Bear Valley Creek (Acres)	Delineation Study Area Total (Acres)
SYSTEM				
E	Estuarine	332.89	0.05	332.94
P	Palustrine	300.87	65.72	366.59
Rp	Riparian	37.92	17.21	55.13
CLASS				
UB	Unconsolidated Bottom	52.49	5.60	58.09
AB	Aquatic Bed	9.86	4.03	13.89
EM	Emergent	523.61	36.07	559.68
SS	Scrub Shrub	30.62	5.25	35.87
FO	Forested	54.51	32.04	86.55

the Project Area is a combination of palustrine (freshwater) and estuarine (saltwater) wetlands and Riparian non-wetlands. Estuarine Systems are those in which salinities during the period of average annual low flow exceeds 0.5 ppt (Cowardin et al. 1979). Areas mapped as Estuarine included not only undiked, tidal areas such as Lagunitas Creek and the undiked marsh north of Giacomini Ranch and Lagunitas Creek, but even some areas inside dikes such as the Giacomini Ranch West and East Pastures, Tomasini and Fish Hatchery Creeks, and Olema Marsh. Acreage of Estuarine Systems within the Project Area totaled 332.94 acres, with almost all of that area occurring in the Giacomini Ranch and adjacent areas (332.89 acres; Table 13). Estuarine influence in these areas results either from tidal surface flow muted to some degree either naturallyor by improperly functioning tidegates (Olema Marsh; Fish Hatchery Creek/northern portion of Giacomini Ranch West Pasture; Tomasini Creek) or from indirect tidal interaction with the saline groundwater table. The elevated salinities observed in the diked pastures' groundwater tables probably derive from residual marine salts deposited in underlying estuarine sediments when these areas were open to tidal flushing (KHE 2006a). Most of the mapped Estuarine areas consisted of the Intertidal Subsystem (2), but the Subtidal Subsystem (1) did occur in Lagunitas Creek, the northern portions of Fish Hatchery and Tomasini Creeks, and some diked portions of old sloughs in the Giacomini Ranch.

Because of the extensive tidal influence at the northern end of the Project Area, Palustrine Systems dominate the southern end, particularly Olema Marsh, Bear Valley Creek, and the southern end of the Giacomini pastures. In the northern end of the Project Area, Palustrine areas are relegated to the fringes of the Giacomini Ranch on higher gradient sections of creeks such as Tomasini and Fish Hatchery and small drainages and higher elevation areas adjacent to seeps flowing off the Inverness Ridge or Point Reyes Mesa. Acreage of Palustrine Systems within the Project Area totaled 366.6 acres, with 300.9 of those acres occurring in the Giacomini Ranch (Table 13). Approximately 0.1 acre of Palustrine System wetlands also occurred along the established access route to one of the quarries that would be used as an excavated sediment disposal location, the McClure DG. These wetlands represented part of a large swale complex that drains these pastures. Often a sharp juxtaposition exists between Palustrine and Estuarine wetlands, as evidenced by the West Pasture freshwater marsh or Palustrine Emergent marsh polygon (e.g., PEM1Eb) adjacent to Sir Francis Drake Boulevard that is bordered by an Estuarine Emergent (E2EM1R) Diked Tidal Salt Marsh polygon with summer groundwater salinities as high as 50 ppt. There are no Palustrine Subsystems.

Some areas on the upland perimeter of the Project Area were mapped as the NWI's new Riparian (Rp) System category. Riparian (Rp) Systems support Scrub Shrub or Forested Class hydrophytic vegetation, but lack wetland hydrology. Acreage of Riparian Systems within the Project Area totaled 55.1 acres, with 37.9 of those acres occurring in the Giacomini Ranch (Table 13). Most areas within the Project Area that qualified as Riparian (Rp) are Intermittently (J) or Temporarily Flooded (A) in which flooding occurs only at peak storm flow discharge or for several days following peak discharge or flooding occurs only an episodic basis (i.e., recurrence interval > 2 years). These Riparian Systems are dominated by deeply rooted riparian tree and

shrub species -- many of which are considered hydrophytic at least in their seedling and juvenile stages -- that typically rely on groundwater tables that are greater than 12 inches from the soil surface. All of the Riparian System areas were mapped as Lotic (1) or flowing water Subsystems, because they occurred at the periphery of freshwater streams, creeks, drainages, or actively flowing seeps.

Class/Subclass. Most of the Project Area is dominated by low-growing Emergent (EM), Persistent (1) plant species such as pastoral, salt marsh, and ruderal forbs and herbs. Acreage of Emergent Class within the Project Area totaled 559.7 acres, 523.6 acres of which occur in the Giacomini Ranch and adjacent areas (Table 13). Areas with taller vegetation (Scrub Shrub or Forested) tended to occur outside the Giacomini Ranch or on its perimeter due the lack of grazing and/or higher quantities of freshwater from seeps and drainages and creeks. Acreage of Scrub Shrub Class in the Project Area totaled 35.9 acres, with 30.6 of those acres occurring on the perimeter of the Giacomini Ranch or adjacent areas (Table 13). As with Aquatic Bed, the areal extent of the Scrub Shrub class was relatively low within all regions of the Project Area. Acreage of the Forested Class totaled 86.6 acres, with 54.5 acres occurring on the perimeter of the Giacomini Ranch and adjacent areas (Table 13). The Forested Class was the dominant class in the portion of Bear Valley Creek (20.6 acres) within the Project Area and the second highest class in the White House Pool and Green Bridge County Park (54.5) and Olema Marsh (11.4 acres) areas (Table 13). Unconsolidated Bottom subclasses within the Project Area consisted largely of Cobble-Gravel (1), Sand (2), Mud (3), and Organic (4). Mineral soils (Subclasses 1-3) dominated most of the Project Area, but a combination of Organic and Mud sediments occurred in some of the unvegetated portions of Olema Marsh.

Park Service Oversight

Director's Order #77-1 established Park Service policies, requirements, and standards for implementing Executive Order 11990, which directs federal agencies to avoid long- and short-term impacts to wetlands. The Park Service uses the Cowardin classification system (Cowardin et al. 1979) as the basis for creating a Park Service standard for defining, classifying, and inventorying wetlands that might be subject to adverse impacts and Park Service oversight.

Park Service lands within the Delineation Study Area generally include the Giacomini Ranch and portions of Bear Valley Creek upstream of Bear Valley Road and the southern 14.0 acres of Olema Marsh. Wetlands potentially subject to management and oversight by the Park Service were delineated using the Cowardin wetland delineation definition developed by the USFWS (Parsons 2005). This definition relies on the presence of two of three criteria – wetland hydrology and hydrophytic vegetation or hydric soils – to classify areas as wetlands. Because of the similarity of this approach to that of the Corps, the Seashore proposed to delineate these wetlands by modifying, if necessary, the boundary line proposed for potential Corps' jurisdiction to incorporate areas that met two, but not necessarily all three, criteria (Parsons 2005).

After reviewing information collected during the delineation, there did not appear to be any areas that would require expansion of the Corps' potential jurisdictional boundary (Parsons 2005). There were some areas that technically only met two of the criteria, but most of these areas qualified as Corps' wetlands, as well, because wetland hydrology and hydrophytic vegetation were present, and the absence of hydric soil indicators could be explained by the fact that soils were fill, recently disturbed, or alluvial and therefore less likely to display obvious hydric soil indicators. Therefore, wetlands potentially subject to management and oversight by the Park Service in the Project Area total 446.4 acres.

CDFG

CDFG has historically had a more limited jurisdiction than the Corps, focusing specifically on lakes, major tidal sloughs, rivers, and streams, where streams are defined as "....a body of water that flows at least periodically or intermittently through a bed or channel having banks...." Jurisdiction is typically defined as the bed of the drainage and the bank up to the top of significant cut. CDFG jurisdiction over riparian habitat is discussed in the next section.

CDFG jurisdiction in the Project Area would include only non-federal lands, specifically portions of Lagunitas Creek owned by the State Lands Commission, Wildlife Conservation Board, or privately owned; Fish Hatchery Creek directly upstream and downstream of the Giacomini Ranch; 1906 Drainage directly upstream of the Giacomini Ranch; the northern portion of Bear Valley Creek and Olema Marsh, and the portion of Tomasini Creek upstream of Mesa Road (Figure 34). CDFG jurisdiction on Lagunitas Creek is somewhat complicated, because, in the southern portion, it would extend to top of bank on the southern bank of the creek, where

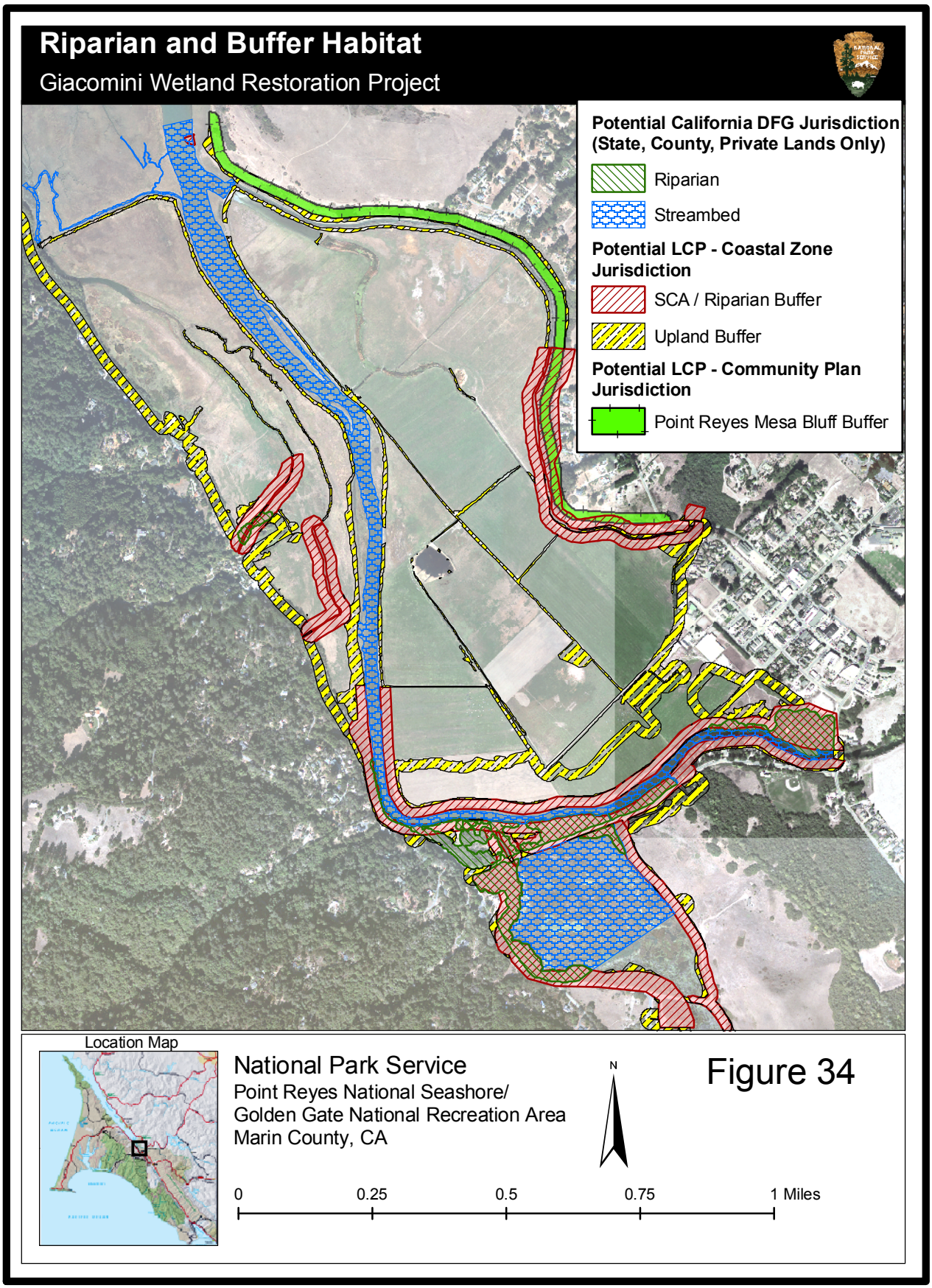

Riparian and Buffer Habitat
Giacomini Wetland Restoration Project
Potential California DFG Jurisdiction (State, County, Private Lands Only)
Riparian
Streambed
Potential LCP - Coastal Zone Jurisdiction
SCA / Riparian Buffer
Upland Buffer
Potential LCP - Community Plan Jurisdiction
Point Reyes Mesa Bluff Buffer
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 34

lands are privately owned or owned by the Wildlife Conservation Board. On the northern bank, which is the Park Service-owned Giacomini Ranch, it would extend to the Ordinary Low Water mark, which is the ownership boundary for State Lands Commission. From White House Pool, CDFG would have jurisdiction over Lagunitas Creek below the OLW mark, because both banks of the creek are owned by the Park Service. CDFG jurisdiction on private lands is not shown. Acreage of potential CDFG jurisdiction over streams, rivers, lakes, and major sloughs in the Project Area totals 73.6 acres (Figure 34).

Riparian Buffers and Protection Ordinances

While riparian areas are often protected through federal regulations and policies as "wetlands," riparian areas have received some special protection of their own through state and local regulations and ordinances.

- ***CDFG***. In addition to streams, rivers, and lakes, CDFG also typically includes adjacent riparian areas within its jurisdiction. Jurisdiction is typically defined as extending to the outer limits of riparian vegetation where it occurs beyond the bank cut. CDFG jurisdiction in the Project Area would include only non-federal lands, specifically portions of Lagunitas Creek owned by the State Lands Commission, Wildlife Conservation Board, or privately owned; Fish Hatchery Creek directly upstream and downstream of the Giacomini Ranch; 1906 Drainage directly upstream of the Giacomini Ranch; the northern portion of Bear Valley Creek and Olema Marsh, and the portion of Tomasini Creek upstream of Mesa Road (Table 14; Figure 34). Acreage of potential CDFG jurisdiction over riparian habitat in the Project Area totals 24.7 acres (Figure 34).

- ***Coastal Zone***. Marin County has enacted a Streamside Conservation Area (Marin County Code, Title 22, Section 22.56-G(3), however, within the Coastal Zone, the SCA is defined by the Local Coastal Plan. Buffers in the Coastal Zone are defined to include all riparian vegetation on both sides of the stream AND the area 50 feet landward from the edge of the riparian vegetation (Marin County Comprehensive Planning Department 1981). In no case shall the stream buffer be less than 100 feet in width, from either side of the stream, as measured from the top of the stream bank. No development or vegetation removal is permitted within this buffer unless no alternative sites are feasible. LCP jurisdiction would include both federal and non-federal lands and would therefore incorporate riparian vegetation or "zones" on Lagunitas Creek, Fish Hatchery Creek, 1906 Drainage, Bear Valley Creek, Tomasini Creek, and several other small drainages feeding into the Giacomini Ranch, Lagunitas Creek, and Olema Marsh (Table 14; Figure 34). Acreage of potential LCP jurisdiction over riparian habitat in the Project Area totals 84.9 acres (Figure 34).

Other Buffers and Protection Ordinances

Local policies have established protection ordinances for other types of buffers.

- ***Point Reyes Mesa Bluff***: In addition, the LCP (Marin County Comprehensive Planning Department 1981) and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) have developed some specific protection objectives regarding the Point Reyes Mesa bluff, including, as was stated in the Community Plan (Marin County Community Development Agency 2001), "preservation of the physical, ecological, and visual integrity of the bluff area located above the old railroad right-of-way through the development review process establishment of a 100-foot buffer zone extended eastward from the eastern edge of the railroad grade." Based on the LCP and Community Plan, approximately 17.0 acres at the base of the Point Reyes Mesa Bluff extending from Mesa Road to Railroad Point or the terminus of the Tomales Bay Trail would be subject to oversight under the LCP and Point Reyes Station Community Plan in the Project Area (Table 14; Figure 34). In many areas, the Bluff would also qualify as Corps and CCC jurisdictional wetland and/or riparian habitat subject to oversight by CDFG and the LCP.

- ***Upland Buffer- Wetlands: Coastal Zone***. The Local Coastal Plan has developed policies for protecting upland areas on the perimeter of wetlands. An upland buffer for wetlands at least 100 feet in width minimum has been established on the periphery of wetlands in the Coastal Zone. No development or vegetation removal is permitted within this buffer unless it complies with LCP policies. LCP jurisdiction would include both federal and non-federal lands and would therefore incorporate upland areas in the Project Area in and on the perimeter of the Giacomini Ranch and Olema Marsh. Acreage of potential LCP jurisdiction over upland habitat in the Project Area totals 81.9 acres (Table 14).

TABLE 14. ACREAGE OF RIPARIAN, BLUFF, AND OTHER HABITAT POTENTIALLY SUBJECT TO REGULATION OR OVERSIGHT

	CDFG – Riparian	*LCP – Riparian Buffer*	*LCP and Community Plan – Bluff Buffer*	*LCP – Upland Buffer*
Habitat potentially subject to jurisdiction or oversight	*24.7 acres*	*84.9 acres*	*17.0 acres*	*81.9 acres*

Wetland and Riparian Condition and Functionality

In order to achieve protection of these ecosystems, the Park Service has been directed to "conduct or obtain parkwide wetland inventories to help ensure proper planning with respect to the management and protection of wetland resources" (NPS 2006, Section 4.6.5).

Beginning in 2000, the Seashore initiated an enhanced wetlands mapping project. During the first two phases of the project, more than 911 acres within 230 wetlands polygons or areas were inventoried and mapped. In 2003, the Seashore began a third phase of the wetlands mapping project that focused on the 140,094-acre Tomales Bay watershed. As one of the larger landowners within the Tomales Bay watershed, the Park Service felt that it could contribute to improving water quality within Tomales Bay by identifying potential pollutant sources on its lands and targeting degraded wetlands for restoration (Parsons et al. 2004). In order to evaluate the condition of existing wetlands and how well they are currently functioning, the Seashore recognized that it needed to expand its mapping efforts to incorporate a condition and functional assessment of wetlands. A number of different methodologies exist for assessing wetland condition and/or functions, but, ultimately, the Seashore created a hybrid assessment methodology that incorporated components from several methodologies, including the recently developed California Rapid Assessment Methodology (CRAM; (Collins et al. 2003; 2004). This assessment methodology uses indicators or metrics of wetland condition or functionality based on observable impairments or disturbances to hydrologic processes, hydrologic functions, landscape connectivity, soils, vegetation communities, and ecological functions such as wildlife habitat, as well as qualitatively ranking the number and intensity of potential "stressors" to wetlands such as grazing, contamination, etc. (Parsons et al. 2004).

As part of this functional assessment, more than 1,500 acres and 717 polygons of wetlands were mapped within the western portion of Tomales Bay and Olema Valley (Parsons et al. 2004). Using a semi-quantitative evaluation of scores for both functionality and stressors, sites were ranked as being either high or medium priority for more detailed future evaluation of condition and functionality and possible future restoration. A large percentage of the sites or Functional Units that were considered either high or medium priority for restoration occurred in specific areas of the watershed, including the Waldo Giacomini Ranch in the southern portion of Tomales Bay and the Bear Valley Creek subwatershed (Parsons et al. 2004). In fact, of the six high priority restoration "sites" or drainage areas identified in the Tomales Bay-Olema Valley watershed, three of them were on the Giacomini Ranch, specifically the eastern portions of the East Pasture-Tomasini Creek, the leveed portion of Lagunitas Creek, and the diked northern portions of the East and West Pasture (Parsons et al. 2004).

While functional assessment is still to some degree in its infancy as a tool for characterizing the condition and functionality of wetlands, the Seashore believes that this approach could be very promising in terms of the type of information that it can provide for the resource managers (Parsons et al. 2004). Incorporation of condition and functional assessment could substantially increase the value of the wetland inventory efforts that the Seashore has been conducting since 2000. In addition, this approach will provide a framework for either selection or justification of additional areas selected for source reduction and restoration efforts.

Vegetation Communities of Special Significance – CNDDB Natural Communities

In addition to special status plants, the California Natural Diversity Database (CNDDB) also tracks occurrences of rare and significant vegetation communities that have been imperiled by commercial and residential development, invasion by non-native species, etc. (CDFG 2005). These special habitats or Natural Communities have been described using a vegetation classification system initially developed by Holland (1986) specifically to create a uniform system for classifying communities in which sensitive plant and animal species are found for the CNDDB. CDFG is in the process of transitioning its classification of Natural Communities from the Holland (1986) system to one developed by Sawyer and Keeler-Wolf (1995). Natural Communities are the cornerstone of CDFG's broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity, termed Natural Communities Conservation Planning Program or Habitat Conservation Plans (CDFG 2006). The NCCP began in 1991 with large-scale planning efforts for more than 6,000 square miles of coastal sage scrub habitat that supports the California gnatcatcher and approximately 100 potentially threatened and endangered species (CDFG 2006).

Two special habitats or Natural Communities have potential to occur within the vicinity of the Project Area: Coastal and Valley Freshwater Marsh and Northern Coastal Salt Marsh (CDFG 2005). Coastal Freshwater Marshes are permanently flooded freshwater wetlands with deep, peaty soils dominated by perennial, emergent monocots approximately 4-5 m tall such as rush (*Scirpus* or *Schoenoplectus* spp.) and cattails (*Typha* spp.; Holland 1986). It has been documented from a 34-acre marsh west of Drakes Beach (NDDB 2005). Northern Coastal Salt Marsh is characterized by salt-tolerant halophytes that form moderate to dense cover approximately 1 m tall and is usually separated into "zones" based on tidal elevation – low marsh, mid marsh, and high marsh (Holland 1986). Northern Coastal Salt Marsh is documented from the head of Tomales Bay (CDFG 2005).

Of the vegetation communities mapped within the Project Area, at least four potentially qualify as a CNDDB special habitat or Natural Community: Tidal Salt Marsh-Low, Tidal Salt Marsh-Mid, Tidal Salt Marsh-High, and High Marsh/Upland Ecotone. These communities appear to match the Northern Coastal Salt Marsh habitat described by Holland (1986) and subsequently identified as a special habitat. As noted earlier, Northern Coastal Salt Marsh has already been documented at the head of Tomales Bay. While information on the exact location of this occurrence was not available, it is likely that the CNDDB record refers to the undiked marsh north of the Giacomini Ranch and possibly at the base of the Tomales Bay trailhead. However, this occurrence should be expanded to include the fringe on the outboard portion of the Lagunitas Creek and Giacomini Ranch levees, as well, particularly the northern portions of the levee where the "shelf" is widest.

Most of the freshwater marshes mapped within the Giacomini Ranch do not appear to qualify as a CNDDB special habitat, even the somewhat floristically unique Freshwater Marsh in the West Pasture. According to Holland (1986), Coastal and Valley Freshwater Marshes are characterized by being permanently flooded by freshwater rather than brackish or alkaline waters or waters having variable salinity regimes. Probably because of the historical tidal incursion through the malfunctioning one-way tidegate on Fish Hatchery Creek, this marsh appears to have a highly variable salinity regime, with salinities increasing during the summer and dropping during the winter and spring when seep flows are probably highest. The high spatial (and temporal) variation in salinity within this portion of the West Pasture is reflected in the fact that the "Freshwater Marsh" lies directly adjacent to an area dominated by halophytic species such as pickleweed and saltgrass. For this reason, this marsh would probably not qualify as a CNDDB special habitat.

Conversely, Olema Marsh might qualify as a CNDDB special habitat, as it is permanently flooded with freshwater, with saline incursions limited to the "mouth" of the marsh where Bear Valley Creek flows underneath Levee Road. In addition, it has deep, peaty soils dominated by tall emergent, perennial monocots. In his taxonomic treatment of Marin flora, Howell (1970) characterized Olema Marsh as "perhaps the best freshwater marsh area in the county." However, as pointed out earlier, based on 1862 maps, Olema Marsh appeared to be part of a large tidal marsh complex historically and was probably converted from a brackish to a freshwater marsh by construction of Levee and, later, Bear Valley Roads (Parsons and Allen 2004b). Ironically, then, this hallmark freshwater marsh feature is probably an artifact of anthropogenic disturbance. Even after roads were constructed, Olema Marsh apparently has continued to change both hydrologically and floristically, with increasing water levels within the marsh in recent decades drowning out some of the perimeter riparian vegetation. Ultimately, the fact that Olema Marsh is probably not a natural freshwater system might argue against its inclusion as a CNDDB Natural Community.

Special Status Plant Species

Regulatory and Policy Setting

Numerous species of plants have undergone local, state, or national declines, which have raised concerns about their possible extinction if they are not protected. Special status plant species include those that are legally protected under the federal and California Endangered Species Acts (ESA) or other regulations and those that are considered rare by the scientific community or the Seashore. Special status species can include:

- plants that are listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.11 for animals; various notices in the Federal Register [FR] for proposed species) and/or the California ESA (Fish and Game Code §2050 *et seq*.; 14 CCR §670.1 *et seq*.);
- plants that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 7506 February 28, 1996);
- plants that are designated as former "species of regional concern" (former category 2 candidates for listing) by the Sacramento office of the U.S. Fish and Wildlife Service (USFWS) or "species of special concern" by the California Department of Fish and Game (CDFG);
- plants that meet the definition of rare or endangered under the California Environmental Quality Act (CEQA) (14 CCR §15380), which includes species not found on state or federal endangered species lists;
- plants listed under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.);
- plant species that occur on California Native Plant Society (CNPS) lists; and
- plant species that the Seashore deems locally rare or of special concern, even though they are not officially listed.

The federal ESA of 1973, as amended, requires federal agencies to consult with the USFWS before taking actions that (1) could jeopardize the continued existence of any federally listed plant or animal species (e.g., listed as threatened or endangered) or species proposed for listing, or (2) could result in the destruction or adverse modification of critical or proposed critical habitat. The USFWS has provided the Seashore a list of special status species that have potential to occur in the Seashore, north district of the GGNRA, and Marin County. A list of these species is provided in Appendix A.

The Council of Environmental Quality Regulations for Implementing the National Environmental Policy Act (Section 1508.27) also requires considering if an action may violate federal, state, or local laws or requirements imposed for the protection of the environment. As with special habitats or Natural Communities, CDFG has created a CNDDB of known or reported occurrences of threatened, endangered, rare, or CNPS-listed species within California. Information from the CNDDB on special status plant species within quadrangles in the Seashore and north district of the GGNRA is incorporated into Appendix A, although not all known occurrences within the Seashore and the GGNRA have been reported to the CNDDB historically.

Beyond regulatory mandates to avoid or minimize impacts to special status species, the Park Service Management Policies (2006) encourage parks to strive to recover all federally listed threatened, endangered, or candidate species within park boundaries and to restore their critical habitats. The Park Service also will inventory, monitor, and manage all state and locally species in a manner similar to that of federally listed ones (Section 4.4.2.1.; NPS 2006). Park managers should ensure that park operations do not adversely impact endangered, threatened, candidate, or sensitive species and their critical habitats either within or outside the park and must consider federally and state-listed species and other special-status species in all plans and NEPA documents (NPS-77 Natural Resource Management Guidelines).

Special Status Plant Species Resources within the Project Area

A list of 92 special status plant species with potential to occur in the Project Area is provided in Appendix A**.** This table was prepared using information from the USFWS (2005), CNDDB (2005), and the CNPS Rare Plant Inventory (2005). It also contains information on regulatory status, habitat, and flowering period derived from the CNDDB (2005) and CNPS Rare Plant Inventory (2005). The plant species listed in Appendix A occur in a variety of habitats present in Marin County, including freshwater marshes, coastal salt marsh, coastal prairie, coastal dunes, coastal scrub, riparian scrub, chaparral, valley and foothill grassland, serpentine areas, broadleaf upland forest, and closed-cone and coniferous forest (NDDB 2005). Approximately 30 of the special

status species with potential to occur in the Study Area are found in wetland features such as coastal salt marsh, brackish marsh, freshwater marsh, bogs and fens, vernal pools, and seasonal wetlands.

Of the 92 plant species with potential to occur in the Project Area and vicinity, there appeared to be at least the general type of habitat for more than 60 of those (Parsons 2003). However, the number of species with real potential to occur in the Project Area is probably lower (Parsons 2003). Some of the 92 plant species -- Delta mudwort (*Limosella subulata*; CNPS List 2.1), Mason's lilaeopsis (*Lilaeopsis masonii*; SR; Former FSacSC; CNPS List 1B.1), and Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*; Former FSacSC; CNPS List 1B.2) -- that were recorded as occurring in Marin County appear to have resulted from erroneous identifications, as they have never been observed outside the Sacramento Delta or San Francisco Bay areas (Parsons 2003). Secondly, some of the habitats identified as occurring within the Project Area are very disturbed (e.g., many of the areas mapped as freshwater marsh or seasonal wetlands) and therefore marginal in terms of potential for rare plants (Parsons 2003). Third, some of the terms in the CNDDB such as "freshwater marsh" cover wide variations in this general type of habitat, with most of these species tending to occur in a very specific type of that general habitat (e.g., *Sonoma alopecurus*; Parsons 2003).

Focused surveys documented the presence of six (6) special status species in the Project Area (Parsons 2003; NPS, *unpub*. *data*; Figure 35). Three are former Federal Species of Regional Concern designated by the Sacramento USFWS office: Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*; former FSacSC; CNPS List 1B.2), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*; former FSacSC; CNPS List 1B.2), and Marin knotweed (*Polygonum marinense*; former FSacSC; CNPS List 3.1). In addition to these three species there are two other Species of Local Concern: Pacific cordgrass (*Spartina foliosa*) and salt marsh owl's-clover (*Castilleja ambigua* ssp. *ambigua*). Lastly, Lyngbye's sedge (*Carex lyngbyei*), a CNPS List 2.2 species, has also been observed.

Two species, Humboldt Bay owl's-clover and Lyngbye's sedge, have been recorded within the Giacomini Ranch (Parsons 2003, NPS, *unpub. data*). Point Reyes bird's-beak was observed exclusively in diked and undiked marsh habitats north of the Project Area. A very small patch of another salt marsh species, Marin knotweed also occurred in the undiked marsh north of the Giacomini Ranch, but some distance away from the Giacomini Ranch. Surveys in Olema Marsh did not uncover any rare plant species (Ryan and Parsons, *in prep*.), and the potential habitat for most of the freshwater marsh species is poor. Acreage of habitat for special status species that are directly in the Project Area is listed below in Table 15.

Surveys have also documented the presence of another six (6) special status species in the vicinity of the access route for one of the quarries that would be used for disposal of excavated sediment. Two are former Federal Species of Regional Concern designated by the Sacramento USFWS office: Blasdale's bent grass (*Agrostis blasdalei*, Former FSacSC, List 1B.2) and Michael's reign orchid (*Piperia michaelii*, Former FSacSC, List 4.2). The others are woolly headed spineflower (*Chorizanthe cuspidata* var. *villosa*; List 1.B.1), Point Reyes blennosperma (*Blennosperma nanum* var. *robustum*, List 1B.2), Mountain phlox (*Leptosiphon grandiflorus*, List 4.2), and Point Reyes ceanothus (*Ceanothus gloriosus* var. *gloriosus*, List 4.3). CNPS List 4 species are not considered endangered, but are of limited distribution. Only two species occur directly on the access route or in the quarry work area: Blasdale's bent grass and woolly headed spineflower.

Point Reyes bird's-beak *(Parsons 2003)*: Point Reyes bird's-beak is a hemiparasitic annual herb that grows in the mid- to high marsh areas of coastal salt marshes. Marin County represents the southern end of the existing range for this species, which stretches into Oregon (CNPS 2005). It once occurred in Alameda, Santa Clara, and San Mateo counties, but the historical populations are believed to have been extirpated (CNPS 2005).

Point Reyes bird's-beak

In Marin County, Point Reyes bird's-beak occurs both in coastal salt marshes along the coast and in marshes on the margin of San Francisco Bay. Point Reyes bird's-beak has been documented in several locations within the Seashore and the north district of the GGNRA, principally in Drakes Estero, Limantour Marsh, and in marshes within Tomales Bay. Habitat for this species tends to encompass lower elevation high marshes. The preference for areas with sandy substrates and low-growing vegetation reflects the strong relationship between bird's-beak distribution and abundance and natural disturbance events such as wrack or alluvial material

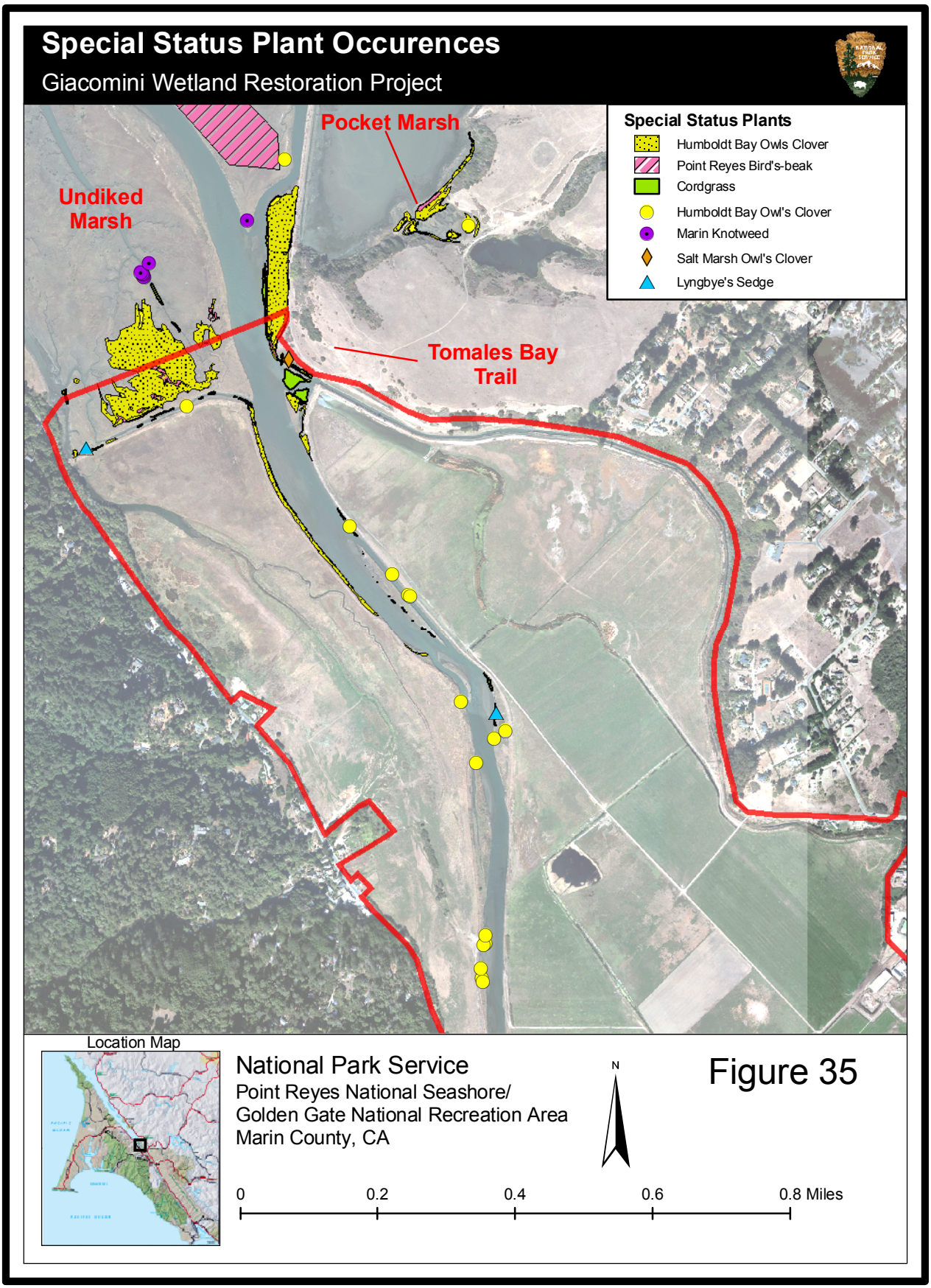

Special Status Plant Occurences
Giacomini Wetland Restoration Project
Pocket Marsh
Undiked Marsh
Tomales Bay Trail
Special Status Plants
Humboldt Bay Owls Clover
Point Reyes Bird's-beak
Cordgrass
Humboldt Bay Owl's Clover
Marin Knotweed
Salt Marsh Owl's Clover
Lyngbye's Sedge
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.2
0.4
0.6
0.8 Miles

Figure 35

TABLE 15. ACREAGE OF SPECIAL STATUS PLANT SPECIES DIRECTLY IN THE PROJECT AREA AND ON ACCESS ROUTES TO SEDIMENT DISPOSAL LOCATIONS

Common Name	Scientific Name	Acres
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	0.4
Humboldt Bay owl's-clover	*Castilleja ambigua* ssp. *humboldtiensis*	16.2
Pacific cordgrass	*Spartina foliosa*	0.9
Blasdale's bent grass	*Agrostis blasdalei*	0.2
Lyngbye's sedge	*Carex lyngbyei*	0.1
spineflower	*Chorizanthe cuspidata* var. *villosa*	0.1

deposition or vegetation dieback that create openings suitable for recruitment and establishment (USFWS *in prep*.).

Throughout its range, this species has experienced a dramatic decrease in numbers due to impacts such as development, foot traffic, non-native plants, and altered hydrology (CNPS 2005). Within the Seashore and the north district of the GGNRA, the main threats to this species appear to be trampling and grazing by tule elk and cattle (PORE; P. Baye, *pers. comm*.). In the Project Area, there were four populations and/or groups of plants in the Pocket Marsh near Bivalve Channel, at the end of the Tomales Bay Trailhead, and in the undiked marsh directly north of the Giacomini Ranch. Most of these populations numbered several hundred to less than a thousand individuals (Figure 35).

***Humboldt Bay owl's-clover* (Parsons 2003).** This species is another hemiparasitic member of the Scrophulariaceae family that also grows in intertidal salt marshes, although its flowering time and microhabitat differ slightly from that of Point Reyes bird's-beak. This annual is listed as occurring in Humboldt and Marin counties (CNPS 2005). Within the Seashore and north district of GGNRA, it occurs commonly in intertidal salt marshes along Drakes and Limantour Esteros and in the southern portion of Tomales Bay.

Humboldt Bay Owl's Clover

There has been some speculation that some of the populations in the Seashore and Tomales Bay might be taxonomically distinct from their northern, Humboldt County counterparts (P. Baye, *pers. comm*.). The Tomales Bay form is distributed in lower elevation and slightly wetter portions of marshes than plants in Humboldt County and has succulent, glabrous leaves and stems with white-tipped, truncate flower bracts (Parsons 2003, P. Baye, *pers. comm*.). In Tomales Bay, owl's-clover often co-occurs in the same intertidal zone (mid-marsh) with Point Reyes bird's-beak (USFWS *in prep*.), although it establishes at slightly lower elevations (Parsons 2003).

Threats to this species include loss of salt marsh habitat due to diking and filling for agriculture and urbanization (USFWS *in prep*.). Within the Seashore and GGNRA lands, severe cattle trampling and grazing pose a significant threat to populations of both subspecies (P. Baye, *pers. comm*.). Some of the largest remaining populations of this species, particularly of the Tomales Bay form, occur in the southern portion of Tomales Bay within the Project Area. There were six occurrences or "populations" within the Project Area that were located at the end of the Tomales Bay Trailhead, along the eastern and western undiked marsh fringes of Lagunitas Creek, and in the undiked marsh north of Giacomini Ranch (Parsons 2003). Occurrences numbered from just a few individuals to more than 10,000 plants in some years (Parsons 2003; Figure 35).

Marin knotweed *(Parsons 2003)*: This annual herb is found principally in Marin, Napa, and Sonoma counties (CNPS 2005). Few occurrences have been documented (CNPS 2005). Hickman (1993) noted that the taxonomic status of the species is uncertain and that it may either be related to *Polygonum aviculare* or may actually be *Polygonum robertii*, a non-native species from the Mediterranean. Populations of this species found within the Seashore have typically been small and spatially dispersed (M. Coppoletta, Seashore, *pers.*

comm.). It is possible that the extent of Marin knotweed within the Seashore and the north district of the GGNRA has been underestimated due to the difficulty of seeing this non-descript plant (Parsons 2003). Only one occurrence of this species has been documented within the Project Area. One individual was observed growing on the undiked marsh deltaic island directly north of Bivalve Channel (Parsons 2003; Figure 35). The primary threat to this species has been characterized salt marsh development (CNPS 2005).

Pacific cordgrass. Pacific cordgrass (*Spartina foliosa*; FSRC) is a member of the grass or Poaceae family that colonizes the low intertidal zones between Mean Sea Level (MSL) and Mean High Water (MHW) in saline portions of estuaries. It often grows along the edge of tidal creeks and on tidal mudflats. Its tall height often contrasts sharply with the low-growing plants of the "mid-marsh" portion of tidal marshes. This particular perennial grass is endemic to central and southern California coastal salt marshes and is found as far south as Baja (Thompson 2001). Its northerly endemic range is Sonoma County (Strong and Daehler 1995), but it can be found in the far north of California, where it has been introduced into Del Norte County. This species occur in several areas within the Seashore, north district of GGNRA, and Tomales Bay.

Pacific cordgrass just north of the Giacomini Ranch

Interestingly, prior to 1990, Pacific cordgrass had not been sighted in Tomales Bay during at least recent times, although it grew in Drake's and Limantour Esteros. In 1974, MacDonald and Barbour documented the "conspicuous absence" of Pacific cordgrass in Tomales Bay despite its extensive presence in San Francisco Bay and other central California estuaries (PWA et al. 1993). There has been some speculation that historic populations of this species may have been lost during the 1906 earthquake, when some portions of Tomales Bay sharply subsided (Peter Baye, *pers. comm*.). Baseline surveys conducted as part of the feasibility study for the proposed project found "several colonizing patches" of Pacific cordgrass at the mouth of Lagunitas Creek in late 1991 (PWA et al. 1993). Since then, numbers of this species have jumped exponentially, particularly at the seaward edge of the Lagunitas Creek delta, where numerous very distinctive, circular patches of cordgrass have colonized the expansive mudflats. Numbers also appear to be increasing substantially within the undiked portions of the Project Area, primarily along tidally influenced creeks such as Lagunitas Creek and tidal creeks in the undiked marsh north of Giacomini Ranch (Figure 35).

Unlike many other salt marsh species that have primarily been negatively impacted by development, the principal threat to Pacific cordgrass is the introduction of the non-native Atlantic cordgrass (*Spartina alterniflora*) to San Francisco Bay in the 1970s as part of a project (Ayres et al. 1999). Atlantic cordgrass, which is native to the Atlantic and Gulf coasts of the United States, immediately became an aggressive competitor with Pacific cordgrass, displacing the native species through both shading and growing over a broader tidal range. The severity of the threat increased when managers and scientists realized that Atlantic cordgrass was also hybridizing with the native species, making it much more difficult to recognize the non-native species in the field. Through genetic testing, scientists have been able to determine that most of the new occurrences of Atlantic cordgrass in San Francisco Bay are primarily hybrids (Invasive Spartina Project 2004). Based on recent surveys, Atlantic cordgrass hybrids have spread throughout the south and central portions of San Francisco Bay, but have yet to invade northern San Francisco Bay (Ayres et al. 1999). The Seashore has documented both Atlantic cordgrass and hybrids in Drake's Estero, but ISP has not yet found these species in Tomales Bay despite several years of survey. More detailed information on invasive *Spartina* species can be found later in this section.

Salt marsh owl's-clover *(Parsons 2003)*: This species (*Castilleja ambigua* ssp. *ambigua*) has distinct ecotypes that grow in salt marshes, as well as coastal grasslands (USFWS *in prep*.). While this species is not formally listed by the USFWS, CDFG, or CNPS, the rarity of the salt marsh ecotype within the San Francisco Bay region could eventually lead to salt marsh owl's clover being considered a species of regional significance. As with *Castilleja ambigua* ssp. *humboldtiensis* (former FSacSC; CNPS List 1B.2), this species grows in intertidal salt marshes, although its flowering time and microhabitat differ slightly. Within salt marshes, subspecies *ambigua* tends to establish at higher elevations near Mean High Higher Water (MHHW) that are

often ecotonal to grasslands and is distinguished from subspecies *humboldtiensis* by its hairy stems and leaves. Once described as "common along the borders of salt marshes" in the late 19th century (Greene 1894; USFWS *in prep.*), salt marsh owl's clover is nearly extirpated in the San Francisco Bay estuary, with only one large modern population in Contra Costa County and potentially a few others in San Pablo Baylands remaining (USFWS *in prep*.). There are a few, usually small, salt-tolerant populations of this species along central California coastal marshes outside San Francisco Bay, including at Rodeo Lagoon, Marin Headlands, Pine Gulch Creek in Bolinas Lagoon, Limantour Marsh, and Tomales Bay Trailhead marsh (USFWS *in prep*.). Within the Seashore and GGNRA lands, severe cattle trampling and grazing pose a significant threat to populations of both subspecies (P. Baye, *pers comm*.).

Lyngbye's sedge. Lyngbye's sedge (*Carex lyngbyei*), a member of the sedge or Cyperaceae family, is a perennial herb that is native to California and is also found elsewhere in North America and beyond (CalFlora 2006). It is included by the CNPS on its List 2.1, which contains species that are rare, threatened, or endangered in California, but common elsewhere (CNPS 2005). Marin County is the southern extent of its range in California, which extends north into Del Norte and Humboldt Counties and into Oregon. Within Marin County, it has been documented in the Inverness and Bolinas USGS quadrangles (CNPS 2005), although the Seashore has no documentation of its presence within park boundaries (NPS, unpub. data). Howell (1970) described it as occurring in the "Salicornia (pickleweed) belt of the salt marsh along Tomales Bay near Inverness," which is the southernmost known California station. USFWS noted that this species "almost always occurs under natural conditions in wetlands" (USFWS *in* Calflora 2006). Within the Project Area, Lyngbye's sedge was observed in a moderately sized patch on a Tidal Marsh "shelf" on the outboard side of the East Pasture levee and a small patch with a few individuals in the undiked marsh just north of the Giacomini Ranch's West Pasture (Figure 35).

Blasdale's bent grass. Blasdale's bent grass (*Agrostis blasdalei*), a monocot in the family Poaceae, is a perennial, rhizomatous grass that is native to California and is endemic (limited) to California alone. It has been designated as a species of concern by the regional office of the USFWS and is included by the CNPS on List 1B.2 as rare, threatened, or endangered in California and elsewhere (CNPS 2003). It is a coastal species whose range stretches from Santa Cruz County in the south to Mendocino County in the north. It grows on gravelly soils in coastal bluff, dune, and prairie habitats. Within the Seashore, it occurs on the western edge of the Point Reyes Peninsula from the Lighthouse up to Kehoe Ranch. Within the vicinity of the McClure DG quarry, this species occurred in approximately three (3) medium to large- size patches, including one that rings the backside of the quarry itself. It has probably established in this area, because much of these rolling landscapes on the Point Reyes Peninsula were once coastal sand dunes.

Woolly-headed spineflower. Woolly-headed spineflower (*Chorizanthe cuspidata* var. *villosa*) is an annual herb in the family Polygonaceae that is native to California and is endemic or limited to California alone. It is considered by CNPS to be rare, threatened, or endangered in California and elsewhere (List 1B.2; CNPS 2003). This species is known from fewer than 10 occurrences and is found only in Marin and Sonoma counties. It grows in sandy or gravely soils in coastal habitats, particularly dune and scrub. At the Seashore, it mostly occurs in a small area between Abbots Lagoon and Kehoe Ranch on the Pacific-facing slopes of the Seashore, but one additional population is located on the just above Creamery Bay. At the McClure DG quarry, this species occurred in approximately five (5) medium to large- size patches, one of which crosses the established access route. It has probably established in this area, because much of these rolling landscapes on the Point Reyes Peninsula were once coastal sand dunes.

Threats from Non-Native and Invasive Plant Species

As was evident in the description of Pacific cordgrass, the presence of invasive or non-native species can pose a real threat to the viability and integrity of native or natural vegetation communities. These species can not only displace individual native species, thereby increasing the potential for their extinction, but change entire landscapes, such as the apparent large-scale conversion in California from perennial bunchgrass-dominated to non-native annual-dominated grasslands over the last few centuries that has supposedly now given the state its golden hued hills. In addition, invasive and non-native species can alter the physical and biological processes of ecosystems in ways that are sometimes hard to discern, but that have tremendous impacts on food web and population viability dynamics.

Within the Project Area, the presence of invasive non-native plant species was documented through vegetation mapping, although the specific location and areal extent of occurrences of specific "problem" species were not necessarily mapped unless the occurrence was relatively large (e.g., stands of eucalyptus;

Parsons and Allen 2004b). Invasive species were defined as those ranked by the California Invasive Plant Council (CalIPC) or by the Seashore as a significant threat to native ecosystems of California and/or the parks. CalIPC relies on a categorical system of ranking the seriousness posed by invasive species, with "High" comprising the most invasive ones and the list, "Limited," the least invasive. CalIPC just recently revised its list and ranking system since the last version was introduced in 1999.

The Seashore also manages a comprehensive weed removal program that has targeted a number of this CalIPC species, but that has focused on some very high priority species that include pampas grass (*Cortaderia* spp.), French broom (*Genista monspessulana*), Scotch broom (*Cytisus scoparius*), cape ivy (*Delairea odorata*), eucalyptus (*Eucalyptus* spp.), European dune grass (*Ammophila arenaria*), and iceplant (various species). The Park Service is directed to manage and eradicate invasive plant and animal species that "interfere with natural processes and the perpetuation of natural features, native species, or natural habitats…" (NPS 2006; Section 4.4.4.2).

Approximately 49 CalIPC invasive species occurred in the Project Area (Parsons and Allen 2004b). Although the number of species is relatively high, the number of occurrences and/or areal extent of most of these plants remained comparatively low (Table 16; Parsons and Allen 2004b). Of the 49 species, nine were on the "High" List, which includes the most invasive and widespread invasive species. The most common "High" threat species in the Project Area were fennel (*Foeniculum vulgare*) and Himalayan blackberry (*Rubus discolor*), with Himalayan blackberry acreage in the Project Area totaling 9.36 acres (Table 16). Himalayan blackberry represented a common riparian understory or shrub species, although California blackberry (*Rubus ursinus*) appeared to have a higher percent cover (Parsons and Allen 2004b). Fennel primarily establishes in Ruderal and Disturbed habitats along levees, berms, and other areas. Only two (2) patches of pampas grass (*Cortaderia jubata*) have been observed in the Project Area, with acreage totaling less then 0.01 acres (Table 16). Some efforts at eradicating at one of these patches have already been undertaken under the Seashore's Exotic Management Plan. Cape ivy (*Delairea odorata*) and English ivy (*Hedera helix*) occurred in the riparian habitat adjacent to Sir Francis Drake Boulevard in scattered patches totaling less than 0.4 and 1.8 acres, respectively (Table 16), but, due to these species' invasiveness, their presence represents a threat, because of the proposed project's objective of increasing riparian habitat.

TABLE 16. ACREAGE OF THE DOMINANT INVASIVE NON-NATIVE PLANT SPECIES

Common Name	Scientific Name	Acres
Himalayan blackberry	*Rubus discolor*	9.36
Fennel	*Foeniculum vulgare*	2.77
English ivy	*Hedera helix*	1.79
Poison hemlock	*Conium maculatum*	0.41
Cape ivy	*Delairea odorata*	0.40
Eucalyptus	*Eucalyptus globulus*	0.34
Periwinkle	*Vinca major*	0.30
Harding grass	*Phalaris aquatica*	0.25
Pampas grass	*Cortaderia jubata*	0.01

Twenty-six (26) species on CalIPC's "Moderate" invasives list have been documented in the Project Area, including both regional and widespread invasives (Parsons and Allen 2004b). Of these 26 species, six were very common in the Project Area: bull thistle (*Cirsium vulgare*), poison hemlock (*Conium maculatum*), tall fescue (*Festuca arundinacea*), common velvet grass (*Holcus lanatus*), Italian ryegrass (*Lolium multiflorum*), and pennyroyal (*Mentha pulegium*). Most of these species preferentially established in disturbed areas such as levees or near barns, roads, etc. Densities of Italian thistle and bull thistle typically remained low in polygons in which they occurred, but poison hemlock and tall fescue were often found in dense clumps on levees and within pastures, respectively. Pennyroyal, an obligate hydrophyte or wetland species, was relatively common (88 polygons) in some of the freshwater wetland vegetation communities such as Wet Pasture and Freshwater Marsh. Other Moderate Invasiveness species such as greater periwinkle (*Vinca major*) are less common and restricted to riparian areas, but it, as with Cape ivy, represents a threat to riparian restoration efforts.

Interestingly, common velvet grass, which is strongly threatening the integrity of the parks' coastal grasslands through rapid colonization of coastal prairies and dairy cattle ranches, was not as common as other grasses within the Project Area, nor was Italian ryegrass, which is found in overwhelming numbers in many San Francisco Bay region counties such as Sonoma (Parsons 2005). Conversely, some of the grasses on the Limited Invasiveness list were extremely common, including creeping bent (*Agrostis stolonifera*) and annual beardgrass (*Polypogon monspeliensis*).

Some species that were not on the CalIPC list, but are of great concern to the Seashore, north district of GGNRA, and others are eucalyptus (*Eucalyptus globulus*), giant reed (*Arundo donax*), perennial pepperweed

(*Lepidium latifolium*), and Atlantic cordgrass (*Spartina alterniflora*) and its hybrids with the native cordgrass, Pacific cordgrass (*Spartina foliosa*). Giant reed (*Arundo donax*) does not currently grow in the Project Area, but there are two currently non-spreading occurrences upstream of the Project Area on Olema Creek and tributaries to Lagunitas Creek (Brannon Ketcham, Seashore, *pers comm*.). Eucalyptus was primarily found growing in large stands along Point Reyes Mesa on private lands and on the Tomasini Creek berm and eastern bank of the creek.

As was described under Special Status Species section, the native cordgrass species, Pacific cordgrass, has been designated a Species of Regional Concern due to the fact that non-native, invasive Atlantic cordgrass hybrids have been rapidly displacing it in San Francisco Bay. The 2004 Invasive Spartina Project (ISP) found that the distribution of introduced *Spartina* species throughout the San Francisco Estuary had not changed significantly since the 2001 Bay-wide inventory survey, with most of the hybridized plants remaining in the southern and central portions of San Francisco Bay (ISP 2004). However, the population had spread to 734 net acres, up 52 percent from the 2001 estimate of 482 net acres (ISP 2004). In addition, dense-flowered cordgrass (*Spartina densiflora*) hybrids have also been found in several eastern Marin County marshes (ISP 2004). Atlantic cordgrass and hybrids have also been discovered in Drake's Estero, and the Seashore has been vigorously treating them through tarping to try and eliminate this threat to outer coast populations of Pacific cordgrass. ISP has been conducting surveys in Tomales Bay for Atlantic cordgrass and hybrids during recent years and has yet to discover any, although at least two occurrences of dense-flowered cordgrass have been recorded historically within the Bay.

The other strong threat to salt marsh vegetation communities comes from perennial pepperweed, which has severely invaded many of the high marsh and upland ecotonal areas and levees within San Francisco Bay marshes. In some areas in the northern and southern reaches of the San Francisco Bay Estuary, pepperweed grows in dense stands over extensive areas (May 1995). While this species is capable of establishing in almost any environment, its advance appears primarily confined to wetland (May 1995). Pepperweed is an excellent competitor, growing early in the season, producing a large seed set as well as spreading by rhizomes, able to colonize bare mineral soil, and possibly allelopathic (J. Collins, SFEI, *pers. comm*.; Corliss 1993; Trumbo 1994). The most recent sighting of this species occurred in 2005 in Walker Creek marsh, where Seashore staff observed and attempted to remove several small patches growing on the alluvial levee and an in-channel island. However, pepperweed has apparently also been observed in the past in the Bivalve Channel just north of the Giacomini Ranch (P. Baye, *pers. comm*.).

Riparian understory dominated by Cape Ivy

In general, while the Project Area supports hundreds of non-native species as do many other "wild" and managed areas in California, there are very few invasive species of concern, and these, at least currently, have limited distribution. The invasive species of most concern are cape ivy, pampas grass, English ivy, and, perhaps, greater periwinkle, all of which are associated with or can grow in riparian habitat.

Vegetation Resources and Wetland Functionality

As described in the beginning of this section, vegetation plays a key and prominent role in wetland functionality, particularly for floodwater retention, dissipation of flood flow energy, water quality improvement, and wildlife use and habitat. The effectiveness of vegetation within the Giacomini Ranch in slowing and dissipating the energy of flood flows and improving water quality has not been quantitatively evaluated. However, the predominance of the rather monotypic, low-growing Wet Pasture vegetation community within the pastures, along with relatively sparse amount of riparian vegetation cover along creek banks, would suggest that the ability of vegetation to reduce flood flows has been decreased potentially relative to natural systems. In addition, microtopographic variability within the pastures has been substantially reduced through land-leveling activities, which would also decrease the ability of these areas to dissipate flood flows once floodwaters overtop levees.

The relationship between vegetation and wildlife habitat will be discussed in the Fish and Wildlife Section, but grazing and mowing of vegetation, along with diking, has also minimized the ability of vegetation communities within the Giacomini Ranch and, to some extent, Olema Marsh to contribute to carbon export to Tomales Bay. Through intensive study during the 1980s and 1990s, researchers participating in the LMER program concluded that Tomales Bay is a heterotrophic estuary that receives most of the organic matter used or broken down by organisms from outside sources such as the surrounding watershed lands and fringing marshes (Chambers et al. 1994). Historic tidal marshes such as Giacomini Ranch and Olema Marsh may have played a key role historically in helping to support the food web within this estuary. Interestingly, dredging of drainage ditches to remove aquatic vegetation does appear to have elevated dissolved organic carbon levels in waters relative to undiked marshes, probably because of accelerated breakdown of decaying organic matter and vegetation (Parsons, *in prep*.). However, this carbon cannot be exported to Tomales Bay because of diking and installation of one-way tidegates. Furthermore, the lack of hydrologic connectivity in both the Giacomini Ranch and Olema Marsh, along with removal or suppression of riparian establishment in the Giacomini Ranch, has also minimized the ability of the Project Area to contribute large woody debris to surrounding waterways for use by aquatic organisms.

Fish and Wildlife Resources

One of the most important functions associated with wetlands and riparian areas is the habitat that they provide for wildlife species. Some wildlife species use creeks, wetlands, and riparian habitat for a portion of their life cycles such as breeding or spawning, foraging, refugia, or as a migration corridor. Others are resident species that spend their entire lives within these systems. Adjacent uplands not only support wildlife typically considered upland species, but are also important to wetland- and riparian-associated species for refugia during high tides or high freshwater storm flows, foraging, movement between sites, etc. Most of the Project Area supports wetland and riparian vegetation, as well as some upland, communities that provide important habitat for common and special status wildlife species. The value of the Project Area to fish and wildlife is integrally tied, of course, to the overall value and importance of the Point Reyes region and Tomales Bay watershed.

Fish and Wildlife Resources Setting

The incredible geologic, hydrologic, and floristic diversity within the Point Reyes region has led to a tremendous diversity in the wildlife that use or visit this area. The juxtaposition between the marine environment of the Pacific Ocean and the terrestrial environment of the rugged Marin coastline, combined with the sheltered estuarine environment of Tomales Bay and other embayments, translates into an amazing breadth of habitat types or ecological niches for animals. It is largely because of this habitat diversity that Point Reyes has become world-renowned for its importance to marine, estuarine, and terrestrial wildlife species.

Point Reyes falls within the UNESCO-designated Golden Gate Biosphere Reserve, a partnership of 13 protected areas in the larger San Francisco Bay region. Largely because of its importance to wildlife, Tomales Bay has been designated as a Wetland of International Importance by the Ramsar Convention and is one of only 22 sites in the United States with this designation. Tomales Bay is also one of 16 "wetlands" that qualifies for inclusion as a wetland of regional importance under the Western Hemisphere Shorebird Reserve Network because of its large number of wintering and migrating shorebirds, which number more than 20,000 (Kelly 2001). Within the coastal waters directly offshore of Marin County, there are four of California's 34 Areas of Special Biological Significance (ASBS) and two of only 11 national marine sanctuaries in the United States, with the boundaries for the Gulf of the Farallones National Marine Sanctuary actually extending into Tomales Bay. In some ways, this recognition of the value of Point Reyes and Tomales Bay to wildlife reflects the larger importance of California, which has been recognized as only one of two Biodiversity Hotspots within the continental United States by Conservation International. The entire San Francisco Bay area was characterized as one of the highest, if not the highest, ranked regions in terms of being a Hot Spot of Species Rarity and Richness by NatureServe (2000).

This biodiversity is evident in the number of species that use this area or call it home. The Point Reyes region supports 28 species of reptiles and amphibians, 65 species of mammals, and breeding habitat for 130 species of birds. As many as 32 of these are listed as federally endangered or threatened. Nearly 490 bird species -- representing 45 percent of the avian fauna documented in the United States -- have been sighted on land and

over near shore waters at Point Reyes. The Point Reyes area has more varieties of birds than 20 other individual states (J. Kelly, ACR, *pers. comm*.). Point Reyes, Tomales Bay, and other open water areas on the Marin coast are important stops for migratory species on the Pacific flyway and provides important alternate habitat for birds using San Francisco Bay, the largest estuary in California. Some of what draws overwintering and migrant bird species, as well as resident wildlife, are the richness and diversity of aquatic life within the waters of the Pacific Ocean and Tomales Bay. Tomales Bay represents the second largest Pacific herring spawning estuary in California and supports one of the largest remaining coho salmon (*Oncorhynchus kisutch*) populations along the central California coast. These resources attract several hundred seals and sea lions every winter that come here to pup. Point Reyes is one of only four mainland breeding areas worldwide for northern elephant seals (*Mirounga angustirostris*) and provides haul-out and pupping areas for 20 percent of the mainland California population of harbor seals (*Phoca vitulina*).

Regulatory and Policy Setting

Many wildlife species within the United States have been adversely impacted by increasing urbanization, resource extraction, contamination from pesticides, metals, and other pollutants, and introduction of non-native wildlife species. A number of regulations and policies have attempted to protect wildlife from these negative impacts, with most of these focused either on preservation of key or critical habitat or protection and recovery of the species itself. Some of the habitat protection is accomplished directly through the establishment of Critical Habitat under the federal Endangered Species Act (ESA) or Essential Fish Habitat or California's Lake and Streambed Alteration Agreement (Section 1600; see Vegetation Resources) and LCP Zone II's policies on Environmentally Sensitive Habitats. Marin's draft CWP (2005) is proposing to establish policies for protection of essential habitat for special status species, wildlife nursery areas, movement corridors, and ecotones, because of their importance to wildlife. CCC policy focuses on maintenance, enhancement and, where feasible, restoration of marine resources, particularly areas and species of special biological significance (Article 4, Section 30230). In other cases, habitat protection largely comes indirectly from other legislation aimed at protecting wetlands and riparian habitat for water quality and other purposes under Sections 404 and 401 of the Clean Water Act and under the Streamside Conservation Areas and upland buffer areas around wetlands policies under the LCP for Zone II.

Some wildlife species use creeks, wetlands, and riparian habitat for a portion of their life cycles such as breeding or spawning, foraging, refugia, or as a migration corridor. Others are resident species that spend their entire lives within these systems.

In addition to habitat, federal and state agencies have moved to protect individual species under federal and state ESA. The federal ESA protects threatened and endangered species from unauthorized "take", and directs federal agencies 1) to ensure that their actions do not jeopardize the continued existence of listed species or result in the destruction or adverse modification of Critical Habitat and 2) to utilize their authorities by carrying out programs for conservation. Section 7 of the act defines federal agency responsibilities for consultation with the U.S. Fish and Wildlife Service (USFWS) for most mammal, bird, and fish species or with the National Marine Fisheries Service for anadromous or ocean-going fish. Once a species has been listed under the federal ESA as threatened or endangered, the USFWS is required to identify and protect Critical Habitat. Even bird species that are not necessarily protected under federal or state ESA receive some protection under the Migratory Bird Treaty Act of 1918 (16 U.S.C. §703-712). The Migratory Bird Treaty Act protects almost all migratory wild birds and their parts (including eggs, nests, and feathers) and makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird or to cause a "taking," which is defined as disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young). Policies in the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) specifically identify "protection of Lagunitas Creek, specifically its water quality, coho salmon and steelhead populations, and other aquatic life."

Beyond regulatory mandates, the Park Service Management Policies (2006) require parks to preserve and restore the natural abundances, diversities, dynamics, and habitats of native animal populations and the communities and ecosystems in which they occur (NPS 2006; Section 4.4.1). The Park Service is also specifically urged to not only avoid impacts to threatened or endangered species, but to look for opportunities to increase, restore, or reintroduce them when these habitats or species have been threatened or extirpated (NPS 2006; Section 4.4).

Fish and Wildlife Habitats

While vegetation communities are often strongly correlated with fish and wildlife habitats, particularly in terrestrial zones, groupings of plant species in and of themselves cannot fully define habitats that are of value to animal species. This is particularly true in marine and estuarine environments where many of the important habitats are "plant-less" or primarily water- and substrate-based such as pools and riffles in streams, intertidal mudflats in estuaries, and sandy beaches. Even in vegetated areas, variation in plant species composition or assemblages may be meaningless to wildlife that focus more on the architecture or diversity of plant or canopy (foliage) heights or the size and number of vegetation "patches." Some species, of course, have developed strong linkages with particular plant species such as the Myrtle's silverspot butterfly (*Speyeria zerene myrtleae)* and its caterpillars, which exclusively feed on members of the violet family. The number of truly dependent relationships between animals and particular plant species is relatively small, however, which might suggest that wildlife are largely not dependent on native plant species as long as non-native species perform similar ecological roles.

Managers and scientists continue to debate the importance of native versus non-native species to wildlife, particularly as some wildlife species now frequently use non-native species for breeding, nesting, or foraging. Non-native plant species can subtly alter the dynamics of vegetation communities and habitats in such a way as to make them less valuable to wildlife. Invasion into riparian habitat by the low-growing herb greater periwinkle (*Vinca major*) dramatically suppresses establishment of shrubs that provide important habitat for certain riparian avifauna. In addition, establishment of taller riparian invasives such as giant reed (*Arundo donax*) and salt cedar (*Tamarisk* sp.) seem to be associated with decreases in insect populations, and these decreases can negatively affect insectivorous riparian birds (CNPS Policy on Invasive Plant Species (2006).

Ultimately, while terrestrial wildlife habitats are often strongly associated with vegetation, the value of particular habitats for wildlife is often driven by numerous landscape-level and site-level factors such as lack of fragmentation or gaps in habitat "corridors;" habitat or "patch" diversity; the amount of edge habitat relative to interior habitat; canopy closure of trees; hydrology; soils or substrate; and the amount of light penetration in waters, etc. Below is a description of fish and wildlife habitats in Tomales Bay and the Project Area.

Tomales Bay

The diversity of wildlife species using Tomales Bay directly relates to the diversity of habitats present. This diversity is enhanced by the juxtaposition between marine and freshwater influences. Unlike the mouth of Elkhorn Slough in Monterey Bay, which deepens abruptly into a large submarine canyon directly offshore, the Pacific Ocean in Point Reyes and surrounding areas is relatively shallow due to the presence of the Continental Shelf that juts out at least one-quarter mile offshore, creating a light-infused, relatively warm marine environment that supports large kelp and seagrass forests, as well as rocky reefs and sandy bottom habitats. As with other areas along the California coast, strong northeasterly winds produce along this shelf an upwelling effect or turnover of deeper waters that are rich in nutrients and, therefore, very attractive to many aquatic organisms (Smith and Hollibaugh 1998). As the shelf steepens inland, marine subtidal habitats transition into rocky and sandy intertidal zones that are exposed for some period during low tides and are subject to wave action. The westward portion of the Point Reyes Peninsula is largely dominated by expansive sandy beaches that abruptly convert to rocky shoreline on the eastern-facing slopes of Tomales Point adjacent to Tomales Bay.

This shallowing trend continues as the Pacific Ocean moves into Tomales Bay. With a large source of fine sediments coming from its upper watershed, the muddy bottom of Tomales Bay provides a sharp contrast to the sandier and rockier habitats of the Pacific Ocean. Deposition and resuspension of both fine sediment and sands within the Bay has created substantial variation in bathymetry or the topography of the Bay's bottom from the outer to the inner portions, offering both shallow and deeper water habitats, with some subtidal

areas being as deep as 56 feet. Some of the shallow waters that are protected from fast currents support large eelgrass (*Zostera marina*) forests. As of the late 1980s, Tomales Bay had approximately 37 eelgrass beds covering approximately 969 acres, predominantly in the northern or outermost portion of the estuary (Spratt 1989).

During low tides, shallow intertidal areas become exposed mudflat or tidal flats. As was described under Hydrologic Resources, the amount of intertidal mudflat in Tomales Bay has probably increased since the early to mid 1800s, because of the high amount of sedimentation once the watershed became more heavily developed. However, some of these mudflats are being converted to vegetated tidal marsh by colonization of Pacific cordgrass, which was once apparently absent from the Bay (MacDonald and Barbour 1974), but has increased exponentially in cover since the early 1990s. Low marsh areas dominated by Pacific cordgrass have not only colonized mudflats or tidal flats, but started fringing estuarine sloughs and creeks within tidal marshes. These low marsh areas either subtly grade or sharply transition into the mid-, high, and even upland ecotone habitats of salt marshes. As with intertidal mudflats, the acreage of intertidal wetlands in Tomales Bay has almost doubled between 1862 and the present because of the substantial increase in sedimentation.

Movement of the Pacific and Continental Plates along the San Andreas Fault has created topographic relief that enhances habitat diversity. Within the Bay itself, upland islands have emerged along the fault. The moderate – to steep topographic relief of the Inverness Ridge and the coastal marine terraces on the east side of Tomales Bay have created very different habitats within close proximity to the Bay, including mixed broadleaf evergreen and conifer forest on the west and rolling grasslands and occasional stands or forests of oak (*Quercus* sp.) on the east.

The diversity of niches and habitats for wildlife in Tomales Bay can be defined not only vertically by topography, but horizontally by salinity. The broad transition from freshwater to brackish environments within the estuary and from brackish to marine environments within the ocean increases the potential for species richness and diversity. Salinity can create ecological niches not only within vegetated areas, but within the water column itself. Many species are restricted by physiological tolerance to specific salinity regimes. Other species seem to thrive under specific salinity regimes, even migrating to some extent with specific salinity gradients as it changes throughout the year in response to freshwater inflow, tides, and evapotranspiration. As was described under Water Resources – Water Salinity, the Low Salinity Zone or X2, which generally approximates 2 psu or ppt, is often correlated with the presence of particular taxa and species, including certain species of copepod, mysid shrimp, and fish (Kimmerer 2004).

The salinity gradient even promotes diversity in vegetated habitats by creating freshwater, brackish, and salt marsh communities. While most systems show this type of diversity only in a longitudinal gradient, the presence of groundwater seeps and springs along the base of many of the ravines and valleys in this watershed has added a latitudinal component, as well, often creating a perimeter of freshwater or brackish marsh or riparian habitat around the perimeter of tidal marshes, thereby increasing habitat diversity.

Project Area

Considering the high diversity of vegetation and aquatic communities mapped in the Project Area, it is not surprising that the Project Area has a high diversity of fish and wildlife habitats. The Project Area is located in one of the largest estuarine transition zones or interface areas between saltwater and freshwater in Tomales Bay. Wetland and aquatic habitats include open bay, estuarine sloughs and creeks, tidal flats, tidal marsh, brackish and freshwater marsh, riparian thickets, and flooded pastures and meadows (Avocet Research Associates (ARA) et al. 2002). Terrestrial or upland habitats in the immediate vicinity include mixed broadleaf evergreen forest, conifer forest, coastal scrub, coastal grassland, and remnant coastal prairie, as well as certain drier portions of the pastures within the Giacomini Ranch (ARA et al. 2002). Using the vegetation map developed by the Seashore in 2002-2003 (Parsons and Allen 2004b), existing wildlife habitat conditions have been characterized in the Project Area using a combination of canopy architecture or elevation zone (i.e., general height of dominant plant species or intertidal elevation "zone"), hydrologic regime (e.g., seasonally flooded, permanently flooded, intertidal, etc.), and management regime (i.e., highly managed, lightly managed, ruderal, unmanaged; Figure 36).

The value of these habitats for wildlife relates primarily to the diversity and/or rarity of species using these habitats or the abundance of individuals of particular species (J. Evens, ARA *pers. comm*.). High value wildlife habitats support an abundance of different types of wildlife species (e.g., birds, mammals, invertebrates, fish,

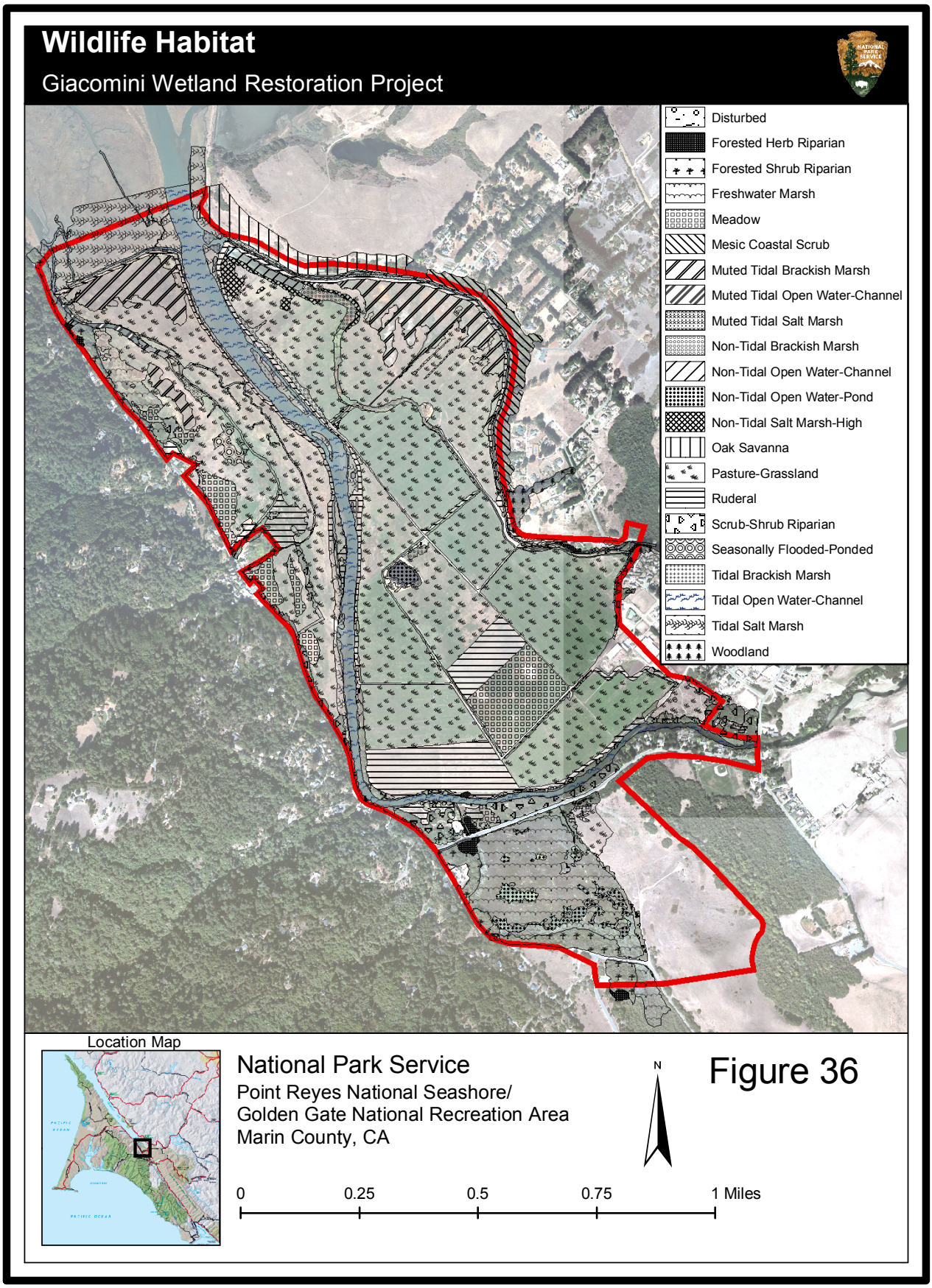

Wildlife Habitat
Giacomini Wetland Restoration Project
Disturbed
Forested Herb Riparian
Forested Shrub Riparian
Freshwater Marsh
Meadow
Mesic Coastal Scrub
Muted Tidal Brackish Marsh
Muted Tidal Open Water-Channel
Muted Tidal Salt Marsh
Non-Tidal Brackish Marsh
Non-Tidal Open Water-Channel
Non-Tidal Open Water-Pond
Non-Tidal Salt Marsh-High
Oak Savanna
Pasture-Grassland
Ruderal
Scrub-Shrub Riparian
Seasonally Flooded-Ponded
Tidal Brackish Marsh
Tidal Open Water-Channel
Tidal Salt Marsh
Woodland
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 36

TABLE 17. ACREAGE OF HIGH VALUE WILDLIFE HABITATS IN THE GIACOMINI RANCH AND OLEMA MARSH PORTIONS OF THE PROJECT AREA

Note: Table includes group, order, or class of organisms and representative species using these habitats. Numbers include portion of Lagunitas Creek in Project Area and part of undiked marsh north of the Giacomini Ranch. Boldface names indicate special status species.

High Value Wildlife Habitat	Group/Order/Class (time period/activity)	Representative Species	
Tidal Waters-Channel/ Subtidal and Intertidal **TOTAL: 40.3**	Mammals	**Southwestern river otter**	Harbor Seal
	Birds/Waterfowl	Greater scaup	Lesser scaup
	Birds/Waterbirds	Belted kingfisher Common loon	**California brown pelica**n **California clapper rail**
	Birds/ Shorebirds	Greater yellowlegs Spotted sandpiper Dunlin	Dowitcher Willet
	Birds/Raptors	Osprey	
	Fish	Topsmelt Bay pipefish English sole Threespine stickleback Arrow goby Prickly sculpin	Staghorn sculpin **Steelhead** **Coho salmon** **Chinook salmon** **Tidewater goby**
	Invertebrates/Reptiles	Mysid shrimp	Northwestern pond turtle
Non-Tidal Waters-Channel and Pond with No Connectivity to Tidal Waters **TOTAL: 3.0**	Birds/Waterfowl	Mallard Gadwall	Wood duck Bufflehead
	Birds/ Waterbirds	Belted kingfisher Eared grebe Black phoebe Virginia rail	Sora Great egret Great blue heron Black-crowned night-heron
	Amphibians	**California red-legged frog** Bullfrog	Pacific tree frog
	Reptiles	**Northwestern pond turtle**	
	Fish	Threespine stickleback Arrow goby	Mosquitofish Longjaw mudsucker
Muted Tidal and Non-Tidal Waters-Channel with Connectivity to Tidal Waters **TOTAL: 2.2**	Birds/Waterfowl	Mallard Gadwall	Green-winged Teal
	Birds/ Waterbirds	Belted kingfisher Greater Yellowlegs Willet	**Green-backed heron** Great egret Great Blue heron
	Amphibians	**California red-legged frog**	
	Reptiles	**Northwestern pond turtle**	
	Fish	**Steelhead salmon** **Coho salmon** **Chinook salmon** **Tidewater goby**	Threespine stickleback Arrow goby Longjaw mudsucker Mosquitofish
Tidal Salt Marsh **TOTAL: 29.6**	Mammals	California vole	Shrews
	Birds/ Waterbirds	**California black rail** (Mid and High Marsh)	**Great egret**
	Birds/ Shorebirds (roosting)	Greater yellowlegs Godwits	Willets
	Birds/ Passerines	**Saltmarsh common yellowthroat**	Song sparrow
	Birds/ Raptors	**Short-eared owl** Northern harrie**r**	White-tailed kite **Peregrine falcon**
	Fish (high tides)		
	Invertebrates	Gastropods Crustaceans	Amphipods (decomposers)
Tidal Brackish Marsh **TOTAL: 4.8**	Birds/ Waterbirds	Virginia rails	**California black rail**
	Birds/ Passerines	**Saltmarsh common yellowthroat**	Song sparrows Marsh wren
Muted Tidal Brackish Marsh-Mid and Tall **TOTAL: 6.1**	Birds/ Passerines	Saltmarsh common yellowthroat Marsh wren Song sparrow	Red-winged blackbird Savannah sparrow
	Birds/ Waterbirds	Virginia rail Sora	American coot Snowy egret

TABLE 17. ACREAGE OF HIGH VALUE WILDLIFE HABITATS IN THE GIACOMINI RANCH AND OLEMA MARSH PORTIONS OF THE PROJECT AREA

Note: Table includes group, order, or class of organisms and representative species using these habitats. Numbers include portion of Lagunitas Creek in Project Area and part of undiked marsh north of the Giacomini Ranch. Boldface names indicate special status species.

High Value Wildlife Habitat	Group/Order/Class (time period/activity)	Representative Species	
	Birds/ Shorebirds	Greater yellowlegs	Lesser yellowlegs
Muted Tidal Brackish Marsh – Mudflat/ Panne **TOTAL: 13.2**	Birds/ Shorebirds	Dunlin Dowitcher spp. Greater yellowlegs	Wilson's snipe Willet Killdeer
	Birds/ Waterfowl	Gadwall American Wigeon	Green-winged Teal
	Invertebrates		
Freshwater Marsh **TOTAL: 52.8**	Birds/ Waterfowl	Mallard Cinnamon teal Canada goose	Pied-billed grebe Ruddy duck Gadwall
	Birds/ Waterbirds	**California black rail** Virginia rail	Sora American bittern
	Birds/ Passerines	**Saltmarsh common yellowthroat** Red-winged blackbird	Marsh wren Song sparrow
	Amphibians	**California red-legged frog** Pacific tree frog	Bullfrog
	Reptiles	**Northwestern pond turtle**	
	Fish	Threespine stickleback	
Forested and Scrub Shrub Riparian **TOTAL: 45.4**	Mammals	**Southwestern river otter** **Dusk-footed woodrat**	black-tailed deer
	Birds/ Passerines	**Saltmarsh common yellowthroat** Warbling vireo Wilson's warbler	Swainson's Thrush Bewick's wren Purple finch
	Amphibians	**California red-legged frog**	**Pacific tree frog**
Mesic Coastal Scrub **TOTAL: 12.4**	Birds/ Passerines (resident and non-resident)	**Saltmarsh common yellowthroat** **Swainson's thrush**	Warbling vireo Wilson's warbler
Tidal Salt Marsh- High/ Upland Ecotone; Uplands **TOTAL: 3.6**	Mammals	Voles (refugia)	Shrews (refugia)
	Birds/ Waterbirds	**California black rail** (refugia)	**California clapper rail** (refugia)
	Birds/ Passerines	**Saltmarsh common yellowthroat** Savannah sparrow	Song sparrow Wrentit
Seasonally Flooded-Ponded Pasture-Grassland **TOTAL: 1.8**	Birds/ Waterfowl	Wood duck American wigeon Green-winged teal	Gadwall Common merganser
	Birds/ Waterbirds	Great egret	Great blue heron
	Amphibians	**California red-legged frog**	

etc.) or high numbers of a particular type of wildlife group or guild (i.e., areas supporting large numbers of shorebirds or shorebird species) and/or provide important breeding, nesting, or adult habitat for endangered or threatened species that is critical to their continued viability or recovery. Some of the high value habitats in the Project Area include Tidal Salt Marsh, Seasonally Flooded-Ponded Muted and Non-Tidal Brackish Marsh, Forested and Scrub-Shrub Riparian Habitat, Freshwater Marsh, and Mesic Coastal Scrub. A list of characteristic species assemblages and acreages of high value wildlife habitats in the Project Area can be found in Table 17. Listed below are detailed descriptions of wildlife habitats that occur in the Project Area.

Giacomini Ranch – West Pasture. In general, habitat diversity within the West Pasture remains highest on its western perimeter due to a number of potentially interrelated factors, including increased topographic and hydrologic complexity combined with less active agricultural management (Figure 36). On the western side of the Project Area, mixed broadleaf evergreen forest and conifer forest or Woodlands dominate the steep and rugged sides of the Inverness Ridge. These forests stretch from the top of the Ridge, whose highest point is Mt. Wittenberg, to its very base near Inverness Park and Inverness. Because of groundwater seeps and the

prevalence of many small freshwater drainages flowing off the Ridge through steep ravines, riparian thickets of either Forested or Scrub-Shrub Riparian vegetation communities have established all along the toe of the Ridge, with the width of the corridor strongly influenced by amount of groundwater and freshwater flow and land management practices such as riparian removal, grazing, or replacement with horticultural species. Moving eastward, the fringing riparian thicket borders a variety of habitats, including Muted Tidal Brackish Marsh dominated by pickleweed (*Salicornia* or *Sarcocornia virginica*), Freshwater Marsh, and seasonally or temporarily flooded Meadows and Pasture-Grasslands. These diverse habitats transition primarily into temporarily flooded or saturated Meadows and Pasture-Grasslands, most of which are managed by some mowing during the summer. These meadows and pastures abruptly end on the eastern side of the West Pasture with Ruderal levees that have been primarily colonized by short and medium-sized weedy species such as non-native grasses, poison hemlock (*Conium maculatum*), and fennel (*Foeniculum vulgare*), as well as patches of some native species such as blue wildrye (*Leymus triticoides*).

The largest permanent Freshwater Marsh in the West Pasture occurs in the northwestern end of the West Pasture. The 7.2-acre West Pasture freshwater marsh supports a tremendous diversity of microhabitat types, with small to large patches of medium- and tall emergent species such as rush (*Scirpus* or *Schoenoplectus microcarpus*), cattails, bur-reed, bulrush, and rush (*Scirpus* or *Schoenoplectus americanus*) interspersed throughout a matrix of low-growing and floating emergents such as water parsley and hydrocotyle. Approximately 1.8 acres of Seasonally Flooded-Ponded Pasture-Grasslands south of Inverness Park along Sir Francis Drake Boulevard, which flood for an extended period during the spring into early summer, have less habitat diversity, with cover dominated by low-growing and floating emergent plant species exclusively.

Open Water habitat within the West Pasture is restricted primarily to relatively scattered unvegetated sections of creeks and isolated depressional features, some of which may be relicts of when the West Pasture was tidal. Because most of the creeks are relatively low gradient, Low or Tall Freshwater Marsh has established in most of the creek channels. Some intertidal mudflat occurs on the perimeter of creek channels during low tides, particularly on the northern end of Fish Hatchery Creek, but perennial creek flow, combined with the tidegate system, preclude Fish Hatchery Creek and other drainages from becoming fully intertidal.

Olema Marsh and Lower Bear Valley Creek. A similar gradient in habitats occurs at Olema Marsh and lower Bear Valley Creek (Figure 36). Conifer and mixed broadleaf evergreen forests or Woodland on the Inverness Ridge extend to the toe of the ridge, where a riparian thicket of largely Forested Riparian habitat has established due to groundwater and freshwater flow from several small drainages. This riparian thicket transitions downslope into the largest Freshwater Marsh in the Project Area, the Olema Marsh, approximately 39 acres in size. Ponding of water in this marsh is promoted by poor hydraulic connectivity of the marsh with Lagunitas Creek (See Hydrologic Resources for more detailed discussion). Increasing water levels within recent decades appears to be killing some riparian trees closest to the marsh, leaving some dead trees as snags. Most of the marsh is dominated by tall emergents such as cattails, bulrush, rush (*Scirpus* or *Schoenoplectus acutus*), although there are some Freshwater Marsh-Low areas dominated by floating or low-growing emergents such as water parsley. An earlier enhancement project during the 1980s that was undertaken by one of the property owners, Audubon Canyon Ranch, attempted to increase the amount of Open Water-Pond habitat through excavation, however, most of the created Open Water has slowly been recolonized by vegetation. A few willows have colonized spoil piles or berms left by excavation, creating some canopy diversity within the marsh. As with the West Pasture, the marsh also sharply transitions to upland on its eastern perimeter, but, rather than levee, the marsh is bordered by the natural shutter ridge that divides the Bear Valley and Olema Creek watersheds. The shutter ridge supports primarily a low-growing cover of native and weedy grasses and herbs within unmanaged or ruderal Pasture-Grassland habitat.

Because of the abrupt change in creek gradient within this portion of Bear Valley, the lower portion of Bear Valley Creek located directly upstream of Olema Marsh has also turned into a sizeable Freshwater Marsh with no defined channel. Several floodplain terraces of varying elevation on the western perimeter of the creek have expanded the diversity of riparian habitat types within this reach of the creek, creating riparian stands or Forested Riparian dominated by coast live oak and California bay, as well as by alder and several species of willow.

Giacomini Ranch – East Pasture. The habitat gradient within the East Pasture of the Giacomini Ranch differs slightly from that of the West Pasture and Olema Marsh (Figure 36). The East Pasture borders the town of Point Reyes Station, which is situated on Point Reyes Mesa, an elevated coastal marine terrace. Most of the Mesa has been developed, with the exception of GGNRA's Martinelli Ranch at the northern end of the East Pasture, which has retained a somewhat rolling hill topography dominated by Pasture-Grassland somewhat reminiscent of the coastal prairies that once covered a significant percentage of California's central coastline.

The moderately steep slopes of the Mesa support either Coastal Scrub or Mesic Coastal Scrub vegetation communities. Groundwater springs and seep flow on portions of the Mesa have led to establishment of an unusually wet habitat for hillsides dominated by thickets of arroyo willow and coyote brush. One of the largest Mesic Coastal Scrub areas (~12.4 acres) occurs adjacent to Tomasini Creek on what is called the Point Reyes Mesa Bluff midway between the Giacomini Hunt Lodge and the Tomasini Creek tidegate. Coastal Scrub and Mesic Coastal Scrub habitats typically extend to the toe of the Mesa, where they transition either into highly or lightly managed Pasture-Grassland or creeks and ditches.

Many of the ditches and ditched sloughs within the East Pasture support Freshwater Marsh-Low habitat, although there are some stands of tall emergents – primarily cattails and bulrush – in some areas. The Giacominis have maintained some Non-Tidal Open Water-Channel habitats through frequent dredging of ditches and ditched sloughs to remove vegetation for water conveyance purposes. Muted Tidal Open Water-Intertidal habitat is largely precluded, even in Tomasini Creek, by levees, culverts, and tidegates that do not allow ditches or creeks to fully drain.

Several other freshwater and brackish marsh features occur in the East Pasture. The Old and New Duck Ponds are artificial depressional features that were constructed by the Giacominis for duck hunting. While both the East and West Pastures would appear to be relatively flat, both pastures slope downward towards the north, with the lowest elevations being in the northeastern corner opposite the large Mesic Coastal Scrub thicket on the Point Reyes Mesa Bluff. These low elevations, combined with episodic influxes of saltwater during high tides from a culvert on Tomasini Creek, have converted what was once probably a pasture into approximately 13.2 acres of seasonally flooded-ponded Muted Tidal Brackish Marsh-MudFlat/Panne habitat that floods extensively during winter and early spring. Following drawdown, salt-tolerant plant species stunted from prolonged inundation establish, although cover remains sparse. Muted Tidal Brackish Marsh with mid-sized emergent species such as alkali bulrush (*Scirpus* or *Schoenoplectus maritimus*) has colonized deeper portions of a ditch immediately adjacent to the Tomasini Creek berm. Smaller marshes flooded for a shorter period during the winter occur in some of the ponds created by the Giacominis for duck hunting. The Old Duck Pond supports Freshwater Marsh habitat, while the New Duck Pond has developed into approximately 2 acres of Non-Tidal Open Water-Pond and Non-Tidal Brackish Marsh dominated by mid-sized emergent species such as spikerush (*Eleocharis macrostachya*) and alkali bulrush, probably because of the higher amount of residual salts in the soil.

Lagunitas Creek. Outboard of both the East and West Pastures, the levees are fringed by either Tidal Salt Marsh, Tidal Brackish Marsh, and, in the southern portion, Riparian Scrub-Shrub composed primarily of arroyo willow and Himalayan blackberry (*Rubus discolor*; Figure 36). The Tidal Salt Marsh and Tidal Brackish Marsh often occur as elevated "shelves" or as a fringe along the creek, which is Tidal Open Water- Channel habitat (Figure 36). Within the Project Area, Lagunitas Creek provides primarily two types of Open Water habitat. Downstream of White House Pool, the creek is shallow, and, during low tides, expansive flats composed of fine muds and coarse gravel and sands become exposed, creating Tidal Open Water-Channel/Intertidal habitat, although the deepest portions of the creek remain Tidal Open Water-Channel/Subtidal habitat. Upstream of White House Pool, the cattle crossing gravel bar has created a different mix of aquatic habitats through extensive ponding of creek waters. This long, flatwater pool extends to just south of the Green Bridge and is much deeper, remaining largely subtidal, except for the very edges of the creek, which become exposed during very low tides. Some distance upstream of the Green Bridge, the creek becomes more shallow again -- albeit more freshwater in nature than the section downstream of White House Pool -- and converts into more of a riffle, run, and pool structure characteristic of fluvial systems, although anthropogenic and cattle disturbance has probably impacted condition of these aquatic habitats to some degree.

Coho Salmon

North of the Giacomini Ranch, Lagunitas Creek continues to widen as it flows toward Tomales Bay. On its western and eastern perimeter, the creek is bordered by undiked Tidal Salt Marsh. The transition between creek and marshplain is abrupt, with sediment deposition during storms creating relatively high alluvial or natural levees along the creek perimeter. These Tidal Salt Marsh-High/Upland Ecotone habitats subtly grade into the Mid- and High- Tidal Salt Marsh, which extend for some distance northwards towards Tomales Bay. Low elevation Tidal Salt Marsh or Tidal Salt Marsh-Low is restricted to fringes along tidal creeks within the Tidal Salt Marsh, although expansive patches have colonized intertidal mudflats at the very northern edge of the Lagunitas Creek delta. Fringing marsh along the perimeter of Tomales Bay between Inverness Park and Inverness shows a slightly different habitat structure, with Tidal Open Water-Channel/ Subtidal and Intertidal habitats of Fish Hatchery Creek and the Bay transitioning from low elevation Tidal Salt Marsh through Mid- to High Tidal Salt Marsh before abruptly converting to Tidal Salt Marsh-High/Upland Ecotone, Freshwater Marsh, or Riparian Forest or Scrub-Shrub habitat at the toe of the Inverness Ridge.

Fish and Wildlife Habitats of Special Significance

While all habitats are important, some habitats are considered particularly important, because they are considered key to saving the threatened and endangered species that use them. These habitats have received special protection or attention through federal and state regulations or local ordinances. A number of these habitats and the regulatory mechanisms in place for protecting them have been discussed earlier under Vegetation Resources. These include:

- ***Wetlands***. Because of their critical role in improving water quality for both humans and wildlife, waters and special aquatic sites such as wetlands are protected through Section 404 and Section 401 of the Clean Water Act and California's Porter-Cologne Act. Wetlands are also protected through California's Coastal Act and CDFG's Streambed Alteration Agreement. Wetlands are protected under the California Coastal Act for the benefit of "marine organisms" and "human health," and CDFG manages lakes, rivers, and streambeds for the protection of fish, wildlife, and native plant resources. For more information on acreage of wetlands, see Vegetation Resources.

- ***Riparian Areas***. In addition to protection of riparian habitat that qualifies as "wetland" according to federal and state regulatory agencies, riparian habitat is also protected by other state and local regulations and policies. CDFG regulates activities river- and streamside riparian habitat through Streambed Alteration Agreements, and the County of Marin has established a Streamside Conservation Area or stream setback that is superseded in the California Coastal Commission's Coastal Zone by specific policies under the Local Coastal Plan (LCP) that protects riparian habitat. In certain areas, specific riparian habitat is protected: the Point Reyes Station Community Plan has identified preservation of the riparian habitat on the Point Reyes Mesa bluff as a specific objective.

- ***CNDDB Special Habitats or Natural Communities***. CDFG has designated certain habitats or Natural Communities as deserving of protection, although they are afforded less protection than special status species. This designation invokes a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity or multiple special status species. In the Project Area, two special habitats have been identified as potentially occurring – Coastal and Valley Freshwater Marsh and Northern Coastal Salt Marsh. Northern Coastal Salt Marsh would include the undiked marsh to the north of the Giacomini Ranch, as well as the fringe marsh adjacent to Sir Francis Drake Boulevard extending from the Ranch to Inverness. There are two areas that may potentially qualify as Coastal Freshwater Marsh – the West Pasture freshwater marsh and Olema Marsh – but neither would appear to completely meet the qualifications.

Critical Habitat

When the federal government lists a species as endangered or threatened, it is also supposed to identify that species' critical habitat. Critical Habitat includes those areas that are important for the species' survival or recovery and that need special management. While a designated critical habitat area is not intended to include the entire potential habitat of the species, it can include habitat that is not currently occupied by the species. The federal government does not consider economic impacts when it "lists" a species, but it does consider economics when deciding what areas should be designated as critical habitat. The agency is required to use the best available scientific information in making a decision about critical habitat. Only about 12 percent of listed species have a designated critical habitat area.

The Project Area incorporates Critical Habitat area for the federally endangered central California coast coho salmon (*Oncorhynchus kisutch*) and threatened central California coast steelhead (*Oncorhynchus mykiss*). Initially, it used to include Critical Habitat for the California red-legged frog (*Rana aurora draytonii*), but boundaries were adjusted during a recent reproposal of the Critical Habitat listing for this species, and the Marin Units 1 and 2 are currently located some distance east and west of the Project Area, respectively. Marin Unit 2 includes the Drakes Estero and Limantour Estero watersheds on the western portion of the Point Reyes Peninsula, and the boundary line is at least 1 mile or more from the Project Area. Marin Unit 1 appears to include principally the Walker and Chileno valleys northeast of Point Reyes Station. Critical Habitat has been designated for three other species that occur in the Project Area, but those listings are either for different "evolutionary significant units" of the same species (chinook salmon) in other states or different populations within the same state (San Diego and Orange county populations of tidewater goby; *Eucyclogobius newberryi*; FE).

Central California Coast Coho Salmon Critical Habitat. Critical Habitat for the federally endangered central California coast coho salmon population is designated to include all river reaches accessible to listed coho salmon from Punta Gorda in northern California south to the San Lorenzo River in central California, including Mill Valley (Arroyo Corte Madera Del Presidio) and Corte Madera Creeks, tributaries to San Francisco Bay. Excluded are areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Major river basins containing spawning and rearing habitat for this ESU comprise approximately 4,152 square miles in California. The following counties lie partially or wholly within these basins: Lake, Marin, Mendocino, San Mateo, Santa Clara, Santa Cruz, and Sonoma.

Central Coast Steelhead Salmon Critical Habitat. Critical Habitat for the federally threatened central coast steelhead salmon population is designated to include all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays. Also included are all waters of San Pablo Bay westward of the Carquinez Bridge and all waters of San Francisco Bay from San Pablo Bay to the Golden Gate Bridge. Excluded is the Sacramento-San Joaquin River Basin of the California Central Valley as well as areas above specific dams or long-standing, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). In Tomales and Drakes Bays, Critical Habitat does not include areas upstream of Peters Dam, Seeger Dam, and Soulejule Dam.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act is the governing authority for all fishery management activities that occur in federal waters within the United States 200 nautical mile limit, or Exclusive Economic Zone (EEZ). Originally passed and signed into law in 1976, the Magnuson Act, as it was then called, established the U.S. 200 nautical mile limit and by implication legitimized a 200 nautical mile EEZ for all other maritime nations. One of the potentially applicable components of this act to non-oceanic activities is that it requirement conservation and enhancement of Essential Fish Habitat (EFH). Both marine and freshwater EFH designations can be made. Defined by Congress as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity," the designation and conservation of Essential Fish Habitat seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. Non-fishing activities that can affect EFH include dredging and filling. The EFH descriptions and identifications for the Pacific's FMPs were approved on: September 27, 2000, for west coast salmon fisheries. The regulated EFH species in Tomales Bay is coho salmon, which occurs in Lagunitas Creek. Freshwater EFH includes Tomales Bay to the upper portions of its watershed, while the entire outer coastline of Point Reyes has been designated marine EFH.

General Fish and Wildlife Use

Regional and Tomales Bay Setting

As described earlier, the incredible diversity of wildlife attracted to this region by its diversity and complexity of habitats has gained Point Reyes and Tomales Bay international recognition. The Continental Shelf present offshore hosts not only hundreds of resident organisms, but numerous migratory and transient visitors who come to feast on its resources and breed and rear young in its relatively sheltered environs. Coastal upwelling or turnover of nutrients from deeper marine waters due to strong winds dramatically boosts primary

productivity within nearshore waters (Smith and Hollibaugh 1998). The California coast is one of just five major coastal upwelling regions in the world, and while coastal upwelling areas make up only one-tenth of a percent of the ocean's surface area, they account for 95 percent of the global marine biomass and more than 21 percent of the world's fisheries landings (MBARI 2002). Hundreds of invertebrate species take advantage of bountiful resources in submerged rocky and sandy habitats. Plentiful invertebrates and large kelp forests sustain thriving fisheries, including commercial species such as rockfish and Pacific herring. Marine seabirds come seasonally in large numbers to the outer coast and Farallones to breed and nest. In addition, every winter, more than 30 percent of the world's cetacean mammals swim by the coast of Point Reyes, as whales move annually from calving grounds in Baja California to the artic water. Harbor seals and northern elephant seals also come in winter to haul-out and pup, taking advantage of the benign environment and rich food resources.

Many of these marine species find additional foraging, protection, and even nursery habitat in the shallows of Tomales Bay. The Park Service recently initiated a project with several local partners to document the biodiversity of Tomales Bay. By fall 2004, the Tomales Bay Biodiversity Inventory (TBBI) had documented more than 2,000 species in the intertidal and subtidal portions of the Bay, including 28 species of Protozoa, 9 species of Fungi, 262 species of Mollusks, 270 species of Arthopods, 252 species of Annelid Worms, and 419 species of Chordates, which includes mammals and more than 40 species of fish (TBWC 2002; Seashore 2005). The incredible diversity in submerged, intertidal, and upland habitats attracts species that move in and out of the estuary, as well as estuarine species that spend their entire lives within its boundaries. During summer and early fall, many marine fish species, as well as skates, rays, and sharks, move into the Bay to forage on populations of estuarine organisms, many of which are peaking in abundance during this period (TBWC 2002). Non-resident fish species that use Tomales Bay include coho salmon, steelhead, sardines, ling cod (*Ophiodon elongatus*), Pacific herring, northern anchovy (*Engraulis mordax*), and marine surfperch species such as walleye surfperch (*Hyperprosopon argenteum*; Bratovich and Kelley 1995, TBA 1995 *in* TBWC 2002; Pettigrew 2004). Sandier portions of the Bay draw bottom-dwelling fish such as California halibut (Evens 1993). Even marine mammals such as harbor seals and sea lions (*Eumetopias jubatus*) venture into the estuary to feed on herring and other marine species. Harbor seals often haul out and rest on tidal sand bars and sandy beaches within the outer Bay such as Hog Island and Tom's Point, using some areas for pupping (Allen and King 1992). Sea lions feed in the Bay during December and January when the herring and salmon are running (ARA et al. 2002).

The food web within Tomales Bay is also supported by primary producers such as phytoplankton (Spratt 1989), as well as eelgrass. The large eelgrass beds in Tomales Bay provide foraging and nursery habitat, as well as refugia or protection from predators for many species of invertebrates, fish, birds, and mammals (TBWC 2002). Many invertebrates, fish, and even some waterfowl forage in or on eelgrass, including juvenile Dungeness crab (*Cancer magister*), some flatfish species, and bat rays. Pacific herring, which often number as many as 50 million during spawning periods, uses eelgrass and algae such as *Gracilaria* for its eggs (Moore and Mello 1995)*in* TBWC 2002), and least terns (*Sterna antillarum*) and other species such as loons (Gaviiformes); grebes (Podicipediformes), and cormorants (*Phalacrocorax auritus*; CSC) forage on these and other small fish (Palmer 1962) *in* TBWC 2002). Many waterbird species such as surf scoters (*Melanitta perspicillata*), bufflehead (*Bucephala albeola*), scaup, goldeneyes, and black brant (*Branta bernicla*) consume herring roe or eggs (Hardwick 1973; Bayer 1980; Briggs et al. 1987; TBWC 2002) or, in the case of brant, eelgrass itself (Goals Project 1999).

Along with its larger neighbor to the east, Tomales Bay is an important stop on the Pacific Flyway for migratory and overwintering waterfowl and shorebirds. Thirteen years of surveys have recorded approximately 163 waterfowl and shorebird species within the Bay, with 122 of those occurring regularly or at least occasionally (Kelly 2003). During the fall and winter, the Bay supports on average approximately 25,000 waterfowl, tens of thousands of gulls, and 20,000 shorebirds, with the latter statistic earning it a designation as one of 16 Wetlands of Regional Importance by the Western Hemisphere Shorebird Reserve Network (Kelly and Tappen 1998; Kelly 2001). During spring, Marin hosts as many as 150 species of breeding birds, most of which are on the coast (ARA et al. 2002). Tomales Bay cannot compete with San Francisco Bay in terms of sheer numbers, but Tomales Bay supports higher densities of many species (J. Kelly, ACR, pers. comm.) and accounts for a large proportion of many species' statewide population numbers. Tomales Bay represents roughly 30.8, 12.3, and 6.4 percent of the state's total population of black brant, bufflehead, and scoters, respectively (Kelly and Tappen 1998). Tomales Bay is one of only three sites along the Pacific Flyway that support more than 100 red knots (*Calidris canutus*) during spring migration (C. Hickey, PRBO, *pers. comm*.). Ten of the 17 Partners-in-Flight Riparian Focal Species breed in the Point Reyes region (C. Hickey, PRBO, *pers. comm*.), and it may support one-third of the total population of neotropical migrant species such as saltmarsh common yellowthroat (*Geothlypis trichas* var. *sinuosa*; former FSC, CSC; ARA et al. 2002). Many species

move from Tomales Bay to San Francisco Bay or vice versa during migration, including dunlin (*Calidris alpina*; (Warnock et al. 1995) and canvasback (*Aythya valisineria*), greater scaup (*Aythya marila*), and surf scoter (Takekawa et al. *in press*). A large factor in the avian diversity found in Point Reyes comes from rare or extremely rare species, which account for 50 percent of total species observed (Evens 1993).

Tidal Salt Marsh is occasionally used by wading birds and long-legged shorebirds for roosting or foraging, but more commonly by rails such as California clapper rails (*Rallus longirostris obsoletus*; FE, SE), California black rail (*Laterallus jamaicensis coturniculus*; ST), Virginia rails (*Rallus limicola*), and sora (*Porzana carolina*) that remain within intertidal marshes and small channels, where they forage on invertebrates in the mud. Many songbirds are incidental or occasional visitors to Tidal Salt Marsh, including the saltmarsh common yellowthroat. Southwestern river otters (*Lontra canadensis sonorae*; CSC) forage along tidal creeks on macroinvertebrates, building burrows in adjacent Upland Ecotone or riparian habitat. Resident estuarine fish in Tomales Bay include threespine stickleback (*Gasterosteus aculeatus aculeatus*), arrow goby (*Clevelandia ios*), Pacific staghorn sculpin (*Leptocottus armatus*), shiner surfperch (*Cymatogaster aggregata*), bay pipefish (*Syngnathus leptorhynchus*), and non-native species such as yellowfin goby (*Acanthogobius flavimanus*; TBWC 2002, (Pettigrew 2004), with composition sometimes dependent on tidal cycle. Some fish move up onto marshplains during extreme high tides to forage on benthic and epibenthic invertebrates. Northern harriers (*Circus cyaneus*; CSC), White-tailed kites (*Elanus caerulus*), and osprey (*Pandion haliaetus*; CSC) hunt rails and other species in Tidal Salt Marshes, including rodents living in drier portions of wetlands and ecotones.

During extreme high tides or storm events, many avian and mammal species such as rails, rodents, and otters find refuge in uplands bordering the estuary. The steep slopes of the Inverness Ridge, as well as the lower-elevation coastal marine terraces on the east, not only offer refugia and foraging habitat during extreme events, but, of course, habitat for a diversity of terrestrial invertebrates, amphibians, reptiles, birds, and mammals. Some of the most important, unique, or charismatic of these species include the northern spotted owl (*Strix occidentalis caurina*; FT), Point Reyes mountain beaver (*Aplodontia rufa phaea*; former FSC), tule elk (*Cervus elaphus nannodes*), bobcat (*Felis rufus*), and mountain lion (*Puma concolor*).

Habitat diversity within estuaries occurs not only through vertical variability in topography or bathymetry, but through horizontal or longitudinal variability in salinity. Shifts in salinity regime are linked to shifts in wildlife species assemblages and changes in the diversity and type of species, although some species seem to move with ease between regimes. Because of physiological tolerances, many species are restricted to specific salinity regimes, such as the California freshwater shrimp (*Syncaris pacifica*), California red-legged frog, tidewater goby, and northwestern pond turtle. For other species, salinity tolerance shifts between life stages. Marine species such as coho salmon, steelhead, and other anadromous fish use freshwater environments in the upper portions of watersheds for spawning and rearing of young, with the young eventually moving back out to sea. Salmon use brackish areas only as transitional habitat for foraging, resting, or refugia during upstream or downstream migration or during the process of converting from freshwater to saltwater. Other marine species such as California halibut, flounder, and Pacific herring use brackish environments within the estuary as nurseries for young, which return to the sea as adults.

One of the most productive habitats within many estuaries is the estuarine transition zone. Within open water areas of estuaries such as San Francisco Bay, certain invertebrates and fish occur preferentially in the Low Salinity Zone (LSZ) or X2, where salinity approximates 2 psu or ppt (discussed under Water Resources – Water Quality). Significant relationships between X2 and abundance have been found, at least some of the time, for estuarine-dependent copepods, mysids, bay shrimp (*Crangon franciscorum*), and several fish including Pacific herring and starry flounder (Kimmerer 2004). Within Tomales Bay, the Lagunitas and Walker Creek deltas probably represent the largest estuarine transition zones. Conversely, some invertebrate species appear to prefer hypersaline conditions, which occur during the late summer in the innermost portions of Tomales Bay. Discrete populations of closely related species of the copepod genus *Acartia* have apparently been observed in portions of Tomales Bay during hypersaline periods (Kimmerer 1993). Even estuarine circulation patterns can affect species diversity or viability, with the strength of gravitational or classic estuarine circulation linked in San Francisco Bay to successful recruitment for Bay shrimp and starry flounder and movement of mysid, longfin smelt, and striped bass (Kimmerer 2004).

Fish and Wildlife Species Resources Within the Project Area

While moderate to intensive development and management of the Giacomini Ranch and Olema Marsh may have caused wildlife resources to decline relative to historic conditions, the Project Area nonetheless supports

a diverse array of animal species, a large proportion of which are special status because their populations are considered at risk (ARA et al. 2002). During the course of baseline wildlife surveys, at least six reptiles, four amphibian, 32 fish, and 194 bird species were observed in the Project Area. Of the 194 bird species, 49 percent were year-round residents, a pattern that mirrors the region in general (ARA et al. 2002). More specific information on special status species is provided below, and a list summarizing some of the species present can be found in Table 18. While many species are resident to the Project Area or vicinity, numerous others are transients, including even some marine species, that primarily use Tomales Bay, but occasionally frequent the Project Area as a supplement to the more extensive habitats in the Bay itself such as Tidal Open Water-Channel Subtidal and Intertidal habitats (ARA et al. 2002). Sea lions have even been known to occasionally wander as far south as the Project Area (ARA et al. 2002).

Many of the species observed in the Project Area rely upon the complex mosaic of wildlife habitats present. For example, 75 percent of the avian species observed during winter surveys were not restricted to just one habitat, but were utilizing a combination of riparian, marsh, and open water habitats (ARA et al. 2002). The most rare species such as salt marsh common yellowthroat, California black rail, sora, and yellow rail (*Coturnicops noveboracensis*), often moved between Tidal Salt Marsh, Freshwater Marsh, Forested and Scrub Shrub Riparian, and shallowly flooded- ponded Pasture-Grasslands (ARA et al. 2002). This habitat interdependence extended to species other than avian ones. While California red-legged frog breeds and rears in the West Pasture freshwater marsh, during the summer, most frogs may have moved into riparian areas and forested hillsides to the west or possibly into the pastures (Fellers and Guscio 2002; G. Fellers, USGS, *pers. comm*.).

In general, most of this habitat diversity occurs on the perimeter or "edge" of the Giacomini Ranch and, to some extent, Olema Marsh. Within the Giacomini Ranch, the perimeter or edge represents not only the dynamic interface between groundwater, freshwater, and, to some extent, saltwater, but is also less heavily managed for agricultural purposes. In addition, it offers proximity of some very different types of habitat such as coniferous forest or Woodland and Coastal Scrub to the Project Area also act to promote the diversity of wildlife species observed (ARA et al. 2002).

Giacomini Ranch – East Pasture. While both diked pastures are grazed by cattle, the East Pasture differs from the West in that it is more heavily managed through grazing, mowing, ditch dredging, irrigation, and manure spreading and is almost completely disconnected from tidal influence, both of which affect the potential to support wildlife. Diking, perhaps not surprisingly, seemingly impacts aquatic communities more than others. Most of the drainage ditches and diked tidal sloughs within West and East Pastures had very low numbers and diversity of benthic, epibenthic, and macro- invertebrates (NPS, unpub. data). Permanent impoundment of waters does not allow ditches and creeks to become oxygenated through regular exposure, so the muds are very anoxic and support few species, including one species of gastropod (snails) and non-native crayfish, the latter of which may have been introduced by the Giacominis. Numbers and diversity of fish also remained low within Giacomini Ranch waterways, a large percentage of which are hydrologically disconnected from both upstream and downstream water bodies (NPS, unpub. data). Three-spine stickleback and mosquitofish (*Gambusia affinis*), along with, in lesser numbers, goby larvae and longjaw mudsucker (*Gillichthys mirabilis*), were the only fish observed in the drainage ditches and ditched sloughs in the East Pasture, with threespine stickleback representing the principal species observed in Tidal, Muted Tidal, and Non-Tidal waters within the Project Area (NPS, unpub. data, ARA et al. 2002). The lack of hydrologic connectivity, combined with frequent hypoxia or low oxygen conditions potentially caused by ditch dredging, minimizes the number of species that can establish and live in these habitats.

Despite low numbers of invertebrates and fish, ditched waterways provided aquatic and basking habitat for northwestern pond turtles, which were seen "regularly" in the East Pasture (Fellers and Guscio 2002). A few adult California red-legged frogs occurred in the East Pasture, although they were not believed to be breeding adults, and no juveniles were observed (Fellers and Guscio 2002).

Bullfrogs (*Rana catesbeiana*), believed to be one of the primary predators of red-legged frog, have been observed in Tomasini Creek and some East Pasture ditches (Fellers and Guscio 2002). Pastures provide habitat for small rodents such as voles (*Microtus*), gophers (*Thomomys*), and shrews (*Sorex*; ARA et al. 2002). Southwestern river otters (*Lontra canadensis sonorae*; CSC) occasionally swim in drainage ditches near Lagunitas Creek, and, infrequently, red fox (*Vulpes vulpes*) use some of the discarded irrigation pipes in the Pastures, as well as visit the Dairy Facility (L. Parsons, *pers. obs*., J. Evens, *pers. obs*.). Black-tailed deer (*Odocoileus hemionus columbianus*) also move down regularly from the Point Reyes Mesa Bluff to graze in pastures.

TABLE 18. PRESENCE OF GENERAL WILDLIFE GROUPS, CLASS, OR ORDERS AND REPRESENTATIVE TAXA AND/OR SPECIES WITHIN SPECIFIC UNITS OF THE PROJECT AREA

Note: E: East Pasture; TC: Tomasini Creek; W: West Pasture; L: Lagunitas Creek; and O: Olema Marsh

General Groups, Class, or Orders	Representative Taxa or Species	EP	TC	WP	LC	OM
FISH						
Native Estuarine Fish-Resident	threespine stickleback, arrow goby, longjaw mudsucker, staghorn sculpin, prickly sculpin, **Tidewater goby, Tomales roach**	√	√ **TG**	√ **TG**	√ **TR**	√
Non-Resident Native Fish	Salmonids		√	√	√	***?***
	Starry flounder, topsmelt				√	
Non-Native Fish-Resident	Mosquitofish	√		√		
	yellowfin goby				√	
INVERTEBRATES						
Epibenthic Invertebrates	Gammarid amphipods		√	√	√	
Pelagic Invertebrates - Native	Mysid shrimp		√		√	
Pelagic Invertebrates – Non-native	Korean shrimp		√	√	√	
Benthic Invertebrates - Bivalves			√		√	
Macroinvertebrates - Native	Western shorecrab					
Macroinvertebrates – Non-Native	Green crab		√		√	
	crayfish	√		√		
AMPHIBIANS AND REPTILES						
Amphibians - Native	**California red-legged frog**	√	√	√		√
	Pacific tree frog	√	√	√	√	√
Amphibians – Non-Native	Bullfrog	√	√			√
Reptiles	**Northwestern pond turtle**	√	√	√	√	√
BIRDS						
Diving Ducks	Greater and lesser scaup, canvasback, buffleheads, ruddy	√			√	√
Dabbling Ducks	Mallards, gadwall, wigeon, teal, northern shoveler, wood ducks	√	√	√	√	√
Waterbirds	Cormorant, Virginia rails, sora, eared grebe, belted kingfisher, **California black rail, California clapper rail**			√ **BR**	√ **BRCR**	
Colonial Nesting Waterbirds	Herons, egrets,	√		√		
Shorebirds – Deep Probers	Dowitcher, greater yellowlegs, common snipe, willet	√		√		
Shorebirds – Shallow Probers	Dunlin, spotted sandpiper	√		√	√	
Passerines – Riparian/ Neotropical migrants	Swainson's thrush, warbling vireo, Wilson's warbler	√	√	√	√	√
Passerines –Riparian/ Resident	**Saltmarsh common yellowthroat**, Bewick's wren	√	√ **YT**	√ **YT**	√	√ **YT**
Passerines - Marsh	Marsh wren, red-winged blackbird, **Saltmarsh common yellowthroat**	√		√	√	√
Passerines - Grassland	Savannah sparrow, grasshopper sparrow, Western Meadowlark	√		√		
Raptors	Osprey, **American peregrine falcon**, White-tailed kite	√		√	√	?
Non-Native Birds	Turkeys, European starlings	√		√		
MAMMALS						
Small ground-dwelling mammals	Voles, gophers, shrews	√	√	√	√	
Bats		√	√	√	√	√
	Southwestern river otter	√	√	√	√	?
	Red fox	√		√		
	Black-tailed deer	√	√	√		

Avian use of the pastures in the East Pasture was seasonally variable. The northern portion of the pasture themselves frequently hosted roosting Canada geese (*Branta canadensis*), great blue herons (*Ardea herodias*; S4), great egrets (*Ardea alba*; S4), and, occasionally, waterfowl species such as mallards (*Anas platyrhynchos*). Virginia rails and sora established territories in 2001-2002 in one of the ditched sloughs (ARA et al. 2002). In general, ditches supported a low diversity of species that include occasional use by mallards, gadwall (*Anas strepera*), lesser scaup (*Aythya affinis*), eared grebe (*Podiceps nigricollis*), black phoebe (*Sayornis nigricans*), and even belted kingfisher (*Ceryle alcyon*; ARA et al. 2002). Raptors hunt over the East and West Pastures, probably searching for small mammals and unwary birds. However, in general, managed pastures "are relatively depauperate in terms of supporting breeding birds in general and special status species in particular" (ARA et al. 2002). Savannah sparrows (*Passerculus sandwichensis*) did attempt to nest in some of the managed pastures, however, some of the fields were mowed during the height of nesting effort, thus excluding perhaps a third of their population (ARA et al. 2002). The only avian species using managed pastures as its primary habitat was grasshopper sparrow (*Ammodramus savannarum*; former FSC, S2), but it arrived late and did not breed (ARA et al. 2002). Large flocks of migratory swallows sometimes forage low over pastures and marshes, especially early and late in the day (ARA et al. 2002).

Several areas in the East Pasture supported at least seasonally higher avian densities. Waterfowl species such as mallards often use drainage ditches and ditched sloughs in low numbers. Buffleheads regularly use some of the old Duck Ponds created by the Giacominis (ARA et al. 2002). The greatest waterfowl and shorebird use in the East Pastures occurs in what is known as the shallow shorebird area in the northeast corner of the East Pasture, a unique habitat within the Project Area. This Muted Tidal Brackish Marsh-Flat / Panne floods from December through April – although in years with early rainfall, it can be early as October -- with surface runoff, precipitation, and tidal waters that flow into the East Pasture from a culvert in the levee of the Tomasini Creek berm, creating brackish water conditions. Many waterfowl species, especially dabbling ducks such as gadwall, wigeon, and teal, are attracted to this area in the winter (ARA et al. 2002). Shorebirds also gather here in rather high numbers to roost and forage when adjacent tidal flats are inundated at high tide (ARA et al. 2002). Some of the most common shorebird species included dunlin, dowitcher species (*Limnodromus sp*.), greater yellowlegs (*Tringa melanoleuca*), common snipe (*Gallinago gallinago*), willet, and killdeer (J. Kelly, ACR, *pers. comm*.).

Giacomini Ranch – Tomasini Creek. A greater diversity and number of wildlife occurred in creeks and portions of pastures that had at least muted tidal influence. Tomasini Creek's malfunctioning tidegate allows the full upper range of high tides, but attenuates low tides, creating permanent Muted Tidal Open Water-Channel/Subtidal habitat rather than the Muted Tidal Open Water-Channel/Intertidal habitat that would probably exist were the tidegate removed.

Perhaps, the largest benefit of increasing tidal influence and hydrologic connectivity comes from the associated increase in aquatic organisms. Benthic invertebrates still occurred only in low densities, probably because the tidegates and associated structures act to impound waters even during low tides, decreasing Muted Tidal Open Water-Channel/Intertidal habitat and increasing soil anoxia (NPS, unpub. data). The number of epibenthic organisms increased slightly, with Tomasini Creek supporting the non-native brackish water shrimp (*Palaemon macrodactylus*) and native mysid shrimp (*Neomysis mercedis*), an important prey item for salmon (Bratovich and Kelley 1988), along with smaller epibenthic invertebrates such as amphipods, isopods, and insects. The invasive non-native crustacean, green crab (*Carcinus maenas*), may also occur in Tomasini Creek.

Muted tidal influence also increased fish species diversity slightly compared to the East Pasture. Fish in Tomasini Creek included staghorn sculpin (*Gymnocanthus tricuspis*) and prickly sculpin (*Cottus asper*), as well as threespine stickleback and longjaw mudsucker. Starting in 2002, the federally endangered species, tidewater goby, has been observed annually in relatively low numbers in a section of Tomasini Creek from the Giacomini Hunt Lodge to the midpoint of the Point Reyes Mesa bluff. In addition, federally endangered juvenile central coast coho salmon and *Oncorhynchus mykiss* juveniles -- assumed for regulatory purposes to be steelhead -- were found in small numbers in June 2005 in Tomasini Creek (NPS, unpub. data). One steelhead was also observed in 2004 (D. Fong, GGNRA, *pers. comm*.). Any historic runs of steelhead or coho salmon in Tomasini Creek may have been negatively affected by repeated diversions of Tomasini Creek through different parts of the East Pasture (see Water Resources), leveeing of the creek, dredging, and installation one-way tidegates. Furthermore, summer rearing habitat for salmon and steelhead juveniles in upper portions of the watershed may be limited by draw-down of Tomasini Creek in the late summer and early fall during average and dry rainfall years and water quality impacts from operation of the now-closed West Marin Landfill. The increased diversity of aquatic organisms also draws other species, as well, including common North American raccoons (*Procyon lotor*) and southwestern river otter (J. Evens, ARA, *pers. comm*.).

While the western leveed portion of Tomasini Creek does not support much riparian vegetation, the eastern bank has a well-developed riparian corridor that transitions into the expansive and unique Mesic Coastal Scrub habitat that extends across the face of the Point Reyes Mesa bluff. The combination of riparian and coastal scrub habitats attracted about 4 percent of the breeding birds observed in the Project Area during spring, including species such as Swainson's thrush (*Catharus ustulatus oedicus*, CSC), Bewick's wren (*Thryomanes bewickii*; CSC), Wilson's warbler (*Wilsonia pusilla*), Warbling vireo (*Vireo gilvus*), and Allen's hummingbird (*Selasphorous sasin*, CSC; ARA et al. 2002). Winter use of these habitats was slightly higher, with almost 10 percent of the birds observed during winter occurring here (ARA et al. 2002). Saltmarsh common yellowthroat occurred upstream near the Giacomini Hunt Lodge and north of Mesa Road (ARA et al. 2002). Greater yellowlegs and dabbling ducks sometimes use the creek itself (J. Evens, ARA, *pers. comm*.).

Giacomini Ranch –Fish Hatchery Creek and West Pasture. As with Tomasini Creek, muted tidal influence and better hydrologic connectivity with upstream portions of Fish Hatchery Creek watershed appear to increase wildlife diversity in the West Pasture relative to the East, even though it is diked. In addition, pastures in the West Pasture are not as highly managed as the East Pasture, with only annual mowing, occasional creek dredging, and creek flow regulation via tidegates occurring. Grazing pressure is also reduced relative to the East Pasture. As with Tomasini Creek, tidegates do not allow waters to fully drain, thereby retaining largely Muted Tidal Open Water-Channel/Subtidal habitats within creeks and ditched sloughs, although there are some fringes of Muted Tidal Open Water-Channel/Intertidal habitat on the creek perimeter.

Fish assemblages within the West Pasture were very similar to the East, with threespine stickleback and mosquitofish the most common species, although sculpin and arrow goby were also present (NPS, unpub. data, ARA et al. 2002). The number of epibenthic organisms also increased slightly, primarily through occurrence of smaller invertebrates such as amphipods, isopods, and insects. While water quality conditions are generally better in West Pasture drainageways than in the East, fish kills of highly tolerant species such as threespine stickleback occurred occasionally in the West Pasture freshwater marsh, perhaps because elevated primary productivity during the day causes oxygen depletion at night. *Oncorhynchus mykiss* juveniles, assumed for regulatory purposes to be steelhead, were observed in very low numbers (one individual) in Fish Hatchery Creek in both 2001 and 2005 (NPS, unpub. data; ARA et al. 2002). Historic accounts depict a thriving steelhead run on this creek, with a very rough estimate of 10,000 "young" (< 3 inches) in 1899 (Schofield 1899) *in* ARA et al. 2002). Interestingly, despite its name, this subwatershed probably has never supported a "fish hatchery" operation (B. Ketcham, Seashore, *pers. comm*.). In addition, in late 2005, Seashore biologists found five individuals of what has been preliminarily identified as tidewater goby in the West Pasture Old Slough, a tributary to Fish Hatchery Creek.

Northwestern pond turtle appears to occur in lower numbers in the more saline West Pasture than in the East, with only one reported sighting in 2001-2002 (Fellers and Guscio 2002). Conversely, the West Pasture supports the largest population of breeding adult and juvenile California red-legged frogs in the Giacomini Ranch, with frogs primarily utilizing the West Pasture freshwater marsh habitat and adjacent portions of Fish Hatchery Creek (Fellers and Guscio 2002). In 2001-2002, adult frogs totaled as high as 21 (Fellers and Guscio 2002). In 2003, the already malfunctioning tidegate on Fish Hatchery Creek collapsed, increasing the amount of tidal flow. This increase in tidal flow expanded the degree of salinity intrusion into the marsh and appeared to cause a decrease in frog use (G. Fellers, USGS, pers. comm.). While tidal influence was reduced after tidegate repair in fall 2003, salinity intrusion still appears to be occurring. Since 2003, numbers of frogs have not been as high, although 12 adults and one egg mass were found in January 2006 (G. Fellers and P. Kleeman, unpub. data). Predation pressure on this population may come primarily from native predators such as black-crowned night heron (*Nyctiorax nyctiorax*) rather than bullfrogs, which were detected for only the first time in this marsh in 2006 (Fellers and Guscio 2002; P. Kleeman, USGS, *pers. comm*.). A more detailed discussion of the California red-legged frog occurs later in this section.

Southwestern river otter regularly use the levee near the Fish Hatchery Creek tidegate, apparently foraging on crustaceans such as the invasive, non-native green crab. Several otter burrows have been built in the Forested Riparian habitat adjacent to Sir Francis Drake Boulevard at the West Pasture north levee (ARA et al. 2002). Black-tailed deer occasionally graze in the West Pasture Freshwater Marsh, and non-native wild turkeys (*Meleagris gallopavo*) have commonly been observed using Meadows and Pasture-Grassland in the West Pasture, as well.

As with the East Pasture, herons, egrets, and Canada geese occasionally roost in seasonally flooded-ponded or temporarily flooded Meadows and Pasture-Grassland, and waterfowl sporadically use Fish Hatchery Creek and the West Pasture Old Slough. Marsh wrens *(Cistothorus palustris)* frequent stands of cattails and bulrush in

Fish Hatchery and the West Pasture Old Slough. Virginia rails established territories along Fish Hatchery Creek, however, sections of creek with shorter vegetation tended to support primarily song sparrows (*Melospiza melodia*; ARA et al. 2002; J. Evens, ARA, *pers. comm*.). American goldfinch (*Carduelis tristis*) and house sparrow (*Passer domesticus*) flocks occasionally use large patches of tall weeds on the levees such as poison hemlock (*Conium maculatum*). However, the habitat with the highest value to breeding birds was the West Pasture Freshwater Marsh-Forested Riparian association in the northwestern corner of the property (ARA et al. 2002). Saltmarsh common yellowthroat, Virginia rail, song sparrow, marsh wren, blackbird (*Euphagus cyanocephalus)*, and other marsh-riparian associates commonly occur in the marsh and the riparian corridor adjacent to Sir Francis Drake Boulevard. Use of the Freshwater Marsh-Forested Riparian was also high during the autumn and winter, with 40 to 50 percent of all species observed during autumn occurring in riparian-marsh or riparian-ruderal field associations in the northwestern and southwestern corners of the Project Area, respectively (ARA et al. 2002). In addition to these "permanent habitats," waterfowl often congregate in large numbers in the southern portion of the West Pasture in seasonally flooded-ponded Meadows and Pastures that receive significant freshwater inflow from groundwater and small drainages flowing off the Inverness Ridge.

Olema Marsh. While the value of Olema Marsh to avian wildlife is well-documented (Evens and Stallcup 1991, 1992, 1993, 1994; Stallcup and Kelly 2004, 2005), information on the other animals that use this system is not as complete. The marsh provides extensive refugia opportunities from both animal and human "predators," complicating efforts to understand the wildlife community. California red-legged frogs breed in the marsh, but total numbers of this population are not known due to the difficulties of accurately surveying this population (G. Fellers, USGS, pers. comm.). The marsh also supports Northwestern pond turtle, Pacific treefrogs (*Pseudacris regilla*), and bullfrogs, but, again, numbers of the latter, a potential red-legged frog predator, cannot be determined (G. Fellers, USGS, *pers. comm*.). Southwestern river otter used to occur in the marsh, but have not been seen recently, perhaps because impounded conditions in the marsh do not create a sufficient creek gradient to allow passage, at least via water, for otter: otter will move over land, as well as through water, to access areas (J. Evens, ARA, *pers. comm*.). This same issue may account for why no coho salmon, steelhead, tidewater goby, or California freshwater shrimp have been found in Olema Marsh either (Fong 2003; D. Fong, GGNRA, *pers. comm*.; NPS, unpub. data), although this marsh may have served as habitat for all of these historically.

Smolt trapping by the Seashore upstream of Olema Marsh in 1999 captured 21 steelhead – five of which were classified as pre-smolts (Ketcham *in prep.*). Fish species such as stickleback and sculpin were observed in very low numbers in the northern portion of the marsh during 2005, as well as in higher numbers near park headquarters in spring 1999 (NPS, unpub. data). Historically, salmon are believed to have used this watershed, which is one of the reasons that a hunting and fishing club was established during the 1800s. Initially, the fishing and hunting clubs allowed members to fish coho salmon and steelhead trout, but as numbers decreased from overfishing, many clubs began stocking thousands of fish that were not native to this region such as eastern brook trout and Quinnat salmon (Mason 1983). Despite this and other dramatic changes due to agricultural and ranch development, there continued to be reports of 8-14 inch trout in some of the deep pools near the Park's administrative headquarters up until 1982 (B. Ketcham, Seashore, *pers. comm*.). Following 1982, the structure of the creek changed dramatically, with many of the deep pools favored by trout and salmonid species eliminated (B. Ketcham, Seashore, *pers. comm*.). Coho salmon have not been observed, at least in recent times, in the Bear Valley Creek watershed (B. Ketcham, Seashore, *pers. comm*.).

Olema Marsh was at least once considered "one of the most diverse habitats for breeding, wintering, and migrating birds in the Point Reyes area" (Evens 1993). Because of the value of Olema Marsh to birds, breeding bird censuses were conducted between 1984 and 1994 and again in 2004 (Evens and Stallcup 1991; 1992; 1993; 1994; Stallcup and Kelly 2004). During the earlier monitoring, a prolonged drought encouraged conversion of some of the marsh to willow-dominated riparian habitat, and this shift, along with drier conditions in the marsh itself, appear to cause declines from pre-drought numbers of some of the most common breeding birds such as marsh wren, Virginia rail, song sparrow, and salt marsh common yellowthroat, with declines ranging from 36 percent (song sparrow, yellowthroat) to as high as 77 percent (marsh wrens; Evens and Stallcup 1992). Concurrently, numbers of red-winged blackbirds (*Agelaius phoeniceus)* increased by approximately 31 percent, as well as increase in other riparian associates such as black-crowned night heron (*Nycticorax nycticorax*; formerly FSC, S3) and green-backed heron (*Butorides striatus*; Evens and Stallcup 1991, 1992). Between 1984 and the early 1990s, vast flocks of blackbirds often roosted in the marsh at night, and red-winged blackbirds bred actively (Evens and Stallcup 1991). Drought conditions also appeared to attract increased numbers of waterfowl to the marsh, possibly because of lower water levels elsewhere (Evens and Stallcup 1992). In 1993, the drought ended, and populations of many of the previously common bird species rebounded, including marsh wrens, song sparrows, Virginia rails, and

saltmarsh common yellowthroat (Evens and Stallcup 1993, 1994). The increase in riparian vegetation continued to attract riparian associates, the three most common being warbling vireo, Swainson's thrush (*Catharus ustulatus*), and Wilson's warbler (Evens and Stallcup 1994).

Between 1991 and 1994, total number of species ranged from 77-81 during the winter and 44-49 species during the spring (Evens and Stallcup 1991, 1992, 1993, 1994). In 2004, this species richness trend reversed, with the number of species totaling 74 in spring and 65 in winter (Stallcup and Kelly 2004). As before, red-winged blackbird, marsh wren, and song sparrow represented generally the most abundant species in autumn, winter, and spring, along with saltmarsh common yellowthroat, which had at least 12 nesting territories during spring 2004 (Stallcup and Kelly 2004; 2005). California black rails were not detected, but relatively high numbers of Virginia rails occurred in all survey periods, and sora frequented the marsh in fall (Stallcup and Kelly 2004, 2005). The expansion of riparian habitat on the west side of the marsh where the Bear Valley Creek flowed prior to 1998 continues to attract an increasing number of riparian associates. As might be expected, the number of waterfowl species using the marsh typically peaks in winter, although many continue to visit throughout the spring. Common waterfowl species included mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), wood duck (*Aix sponsa*), green-winged teal (*Anas crecca*), cinnamon teal (*Anas cyanoptera*), northern shoveler (*Anas clypeata*), and ring-necked duck (*Aythya collaris*; Stallcup and Kelly 2004, 2005).

Lagunitas Creek. For Lagunitas Creek, as with other California creeks, the story of its fisheries and other resources is strongly interwoven with the history of the watershed and its development since the 1800s. Anecdotal stories told of this area by Spanish explorers and later by European Americans paint a bucolic picture of abundant natural resources, particularly fish and game. Lagunitas, or Papermill Creek as it was once known, reportedly supported a substantial run of steelhead in the late 1800s, estimated at more than 200,000 "young" (<3 inches; Schofield 1899 *in* ARA et al. 2002). Historic coho outmigration to the sea once numbered as many as 3,000 to 5,000 fish annually (Smith 1986).

While watershed development and excessive sedimentation between 1860 and 1950 undoubtedly affected salmonids, as well as other aquatic species, construction of levees and a seasonal gravel dam for impoundment of fresh stream water for pasture irrigation probably ranked as two of the largest impacts to remaining fisheries (ARA et al. 2002). Levee construction precluded fish and other organisms' access to the interior of the former tidal marsh, while the gravel dam largely cut off upstream access and dramatically altered salinity dynamics. These major hydrologic impacts were closely followed in the 1950s with construction of a series of dams for reservoirs in the upper portions of the watershed, substantially reducing sediment loads in the creek (PWA et al. 1993). The temporary gravel dam installed by the Giacominis, known as the old summer dam, impounded waters for almost 1 mile upstream to a point well upstream of the Green Bridge and State Route 1 (KHE 2006a). The long residence time of waters behind the dam resulted in unnaturally warm water temperatures uncharacteristic of natural California coastal systems and essentially eliminated the brackish zone that would naturally move up and down the creek, creating instead a sharp demarcation between salt waters downstream and fresh waters upstream (ARA et al. 2002). This warm, fresh- water impoundment attracted numerous non-native fish species that probably outcompeted and/or foraged upon any native fish species and invertebrates capable of tolerating conditions within the "pool." Seven of the 23 fish species caught in a 1983 survey were non-native species, including largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and black crappie (*Pomoxis nigromaculatus*), that prey on native fish (Bratovich et al. 1984 *in* ARA et al. 2002).

These geomorphic and hydrologic alterations may have initiated a steady decline in population of species such as tidewater goby in Lagunitas Creek (ARA et al. 2002). Within a decade after levees and dams were constructed, tidewater goby, a small annual fish that is adapted to brackish waters and that historically had been recorded within the Lagunitas Creek watershed, was seemingly extirpated from Lagunitas, as well as within all of Tomales Bay. The last sighting in Lagunitas Creek was in 1953 (Swift et al. 1989). One researcher (Wang 1982 *in* ARA et al. 2002) concluded that the absence of tidewater goby in Lagunitas Creek was due to high summer salinities and the inability of the species to migrate upstream due to the gravel dam. Another reason for its decline may relate to the exponential increase in non-native fish with impoundment of warm, fresh waters behind the gravel dam, as non-native fish have been strongly implicated in the species' overall decline (Moyle 1976) *in* ARA et al. 2002). This impoundment probably also negatively affected salmonids, who are sensitive to high water temperatures and predation by non-native species, as well as to obstacles that would limit either the upstream (winter) or downstream (spring, early summer) migration.

In 1997, the Giacominis stopped constructing the gravel dam by the SWRCB, which also mandated minimum instream flow requirements to ensure flow for fisheries. During the summer, freshwater flow rates at Samuel

P. Taylor must equal at least 8 cfs, except during documented drought conditions, when they can drop to 6 cfs. During the winter, starting in November, freshwater flow must equal at least 20 cfs. Two years later, a San Francisco State University graduate student conducted some intensive monitoring during the summer and discovered a sharp decline in the number of non-native fish, with the only species present being yellowfin goby and American shad (*Alosa sapidissima*), neither of which is considered a warm water fish (Pearson 2000, ARA et al. 2002). During 105 seining events between June and August 1999, Pearson (2000) recorded approximately 3,300 individuals and 17 species (ARA et al. 2002). Marine fish species such as Pacific herring, topsmelt, surf smelt (*Hypomesus pretiosus*), and shiner perch (*Cymatogaster aggregata*) represented 89 percent of the total catch (Pearson 2000). Other marine species included northern anchovy, bay pipefish, prickly sculpin, and starry flounder (Pearson 2000). Resident estuarine fish species consisted of threespine stickleback, yellowfin and cheekspot (*Ilypnus gilberti*) goby, and staghorn sculpin (Pearson 2000). As with Bratovich et al. (1984), Pearson (2000) also reported capturing Tomales roach (*Lavinia symmetricus* ssp. 2; CSC) -- although in higher numbers than previously caught.

Based on surveys in 2002 and 2005, fish assemblages appear to differ seasonally, which is probably related to a number of factors, including freshwater inflow rates, salinity, and migration of species within Tomales Bay. Estuarine assemblages comprised of threespine stickleback, arrow goby, sculpin, and occasionally bay pipefish appear to dominate most reaches of the creek in the Project Area during low tide or water periods during spring, early summer, and late fall, when freshwater flows are highest. During high tides in these seasons, large schools of topsmelt move in, along with starry flounder (NPS, unpub. data). Starting in mid-summer through early fall, fish assemblages appear to shift to a more marine-dominated one. In August 2002 surveys, a few shiner surfperch were caught in addition to large numbers of topsmelt (ARA et al. 2002). During 1999, the transition was even more dramatic, with surf smelt, bay pipefish, shiner surfperch, prickly sculpin, Pacific staghorn sculpin, and starry flounder only caught during the summer (Pearson 2000).

While coho and steelhead salmon do not spawn in the Project Area, they do migrate through this area when adults move to spawning grounds upstream during the winter and when juveniles move to Tomales Bay and eventually the Pacific Ocean in spring and summer. Adults and juveniles will use transitional zones of estuaries for foraging and refugia from predators, with some steelhead often spending up to a year in estuaries (Smith 1987). Pearson (2000) recorded coho salmon during spring and early summer sampling within the Project Area, while steelhead occurred during the entire monitoring period from April through August 1999. In June 2005, moderate numbers of juvenile steelhead and coho salmon were found upstream of White House Pool in fresh- to brackish sections of the creek, possibly utilizing some of the refugia provided by dense thicket of willows overhanging into creek waters (NPS, unpub. data). During this same period, large numbers of mysid shrimp -- one of the primary prey items for salmon whose numbers have dropped precipitously within the San Francisco Bay estuary -- were found in creek waters downstream of salmon occurrences and in other undiked marshes (NPS, unpub. data). These dense willows also provide potential habitat for California freshwater shrimp, but surveys in 2001 (Fong 2003) failed to find this species within the Project Area.

In March 2002, smolts of another salmon species, chinook (*Oncorhynchus tshawytscha*; FT), were found in the Project Area (ARA et al. 2002). Chinook spawn in Lagunitas Creek and one of its tributaries, San Geronimo Creek, in lower numbers than coho or steelhead salmon (MMWD 2005). The largest runs of chinook salmon typically occur in the Sacramento-San Joaquin River system and large coastal streams from the Russian River north (ARA et al. 2002). However, Marin Municipal Water District has consistently documented Chinook salmon during its 10 years of monitoring, with 2005 being one of the most successful years to date with 105 estimated chinook salmon (MMWD 2005). It is possible that chinook may have always spawned in small numbers in the Lagunitas Creek watershed: chinook fry were planted in Marin County streams in the late 1800s (ARA et al. 2002). In addition to steelhead, coho, and chinook, there have been anecdotal reports of other anadromous species within this section or upstream sections of Lagunitas and Olema Creeks, including chum salmon (*Oncorhynchus keta*), white sturgeon (*Acipenser transmontanus*) and Pacific lamprey (*Lampetra tridentata*; FSC), as well as possibly green sturgeon (*Acipenser medirostris*; FT; ARA et al. 2002, MMWD 2005). White sturgeon is not listed in California and does not spawn in Lagunitas Creek, but occasionally forages in Tomales Bay (ARA et al. 2002). Green sturgeon, which was recently listed, is known to occur in Tomales Bay and "may also forage in Lagunitas Creek" (ARA et al. 2002).

While removal of the summer dam and establishment of mandatory instream flow requirements has probably improved conditions for fisheries and aquatic organisms within Lagunitas Creek, the watershed and its resources are still affected by hydrologic alterations such as upstream dams. As described earlier, these dams greatly alter hydrogeomorphic processes, which can significantly impact resident and non-resident biota. Dams trap sediment that could be used downstream for spawning by salmon and alter geomorphic and

sediment transport processes that could impact channel and stream structure and, consequently, habitat availability for salmon. In addition, dams change the structure of freshwater flows, typically decreasing the frequency and duration of instantaneous peak flows and increasing the duration of bankfull or ordinary high water flows, which are more erosive and damaging to habitat and possibly to stream biota, as well. As was mentioned earlier, research on the upper watershed of Lagunitas Creek has pointed to a possible "fining" or increase in the amount of fine sediment in the channel substrate, depletion in sediment recruitment directly downstream of the dams, and increase in the intensity and frequency of peak flows, all of which can affect habitat for aquatic organisms, including salmon (Stillwater Sciences 2004); B. Ketcham, Seashore, *pers. comm*.).

Reservoirs can have a dramatic impact on summer flows, as well. Salinity structure in downstream water bodies can be altered by drastically reducing freshwater inflow, prolonging the period and volume of freshwater inflow relative to natural conditions, or causing unnatural fluctuations -- particularly sharp fluctuations -- in freshwater inflow rates. Many organisms are extremely sensitive to changes in salinity, particularly abrupt changes, as they may not be physiologically tolerant of either increases or decreases in salt content of waters. Highly motile species can move in response to fluctuating salinity, although there may be a transitional period in which aquatic diversity is very low as species re-adjust to changed conditions. However, benthic organisms cannot respond as rapidly. High variation in salinity results in low benthic abundance and diversity (Kimmerer 2004), which is consistent with the general pattern of estuarine diversity, in which relatively few species can withstand the fluctuations between freshwater and brackish water (Remane 1971 *in* Kimmerer 2004). Even under stable salinity regimes, however, benthic species diversity is consistently lowest in low-salinity water (Markmann 1986; Nichols and M.M. Pamatmat 1988; Hymanson et al. 1994; Kimmerer 2004).

Lagunitas Creek's fish and invertebrate resources draw both birds and mammals to the Project Area. The open waters of Lagunitas Creek account for approximately 8 percent of all bird species using the Project Area during the winter and approximately one-third of all species during the autumn (ARA et al. 2002). Most of these species are large waterbirds, including some special status ones such as American white pelican (*Pelecanus erythrorhynchos*; CSC), cormorant, heron, snowy and great egret, osprey, and belted kingfisher (ARA et al. 2002). Only the kingfisher breeds on site (ARA et al. 2002). During autumn, young green-backed herons (*Butorides virescens*) frequent the shoreline of Lagunitas Creek, where willows overhang (ARA et al. 2002). Waterfowl using subtidal portions of Lagunitas Creek included canvasback, greater scaup, lesser scaup, common goldeneye (*Bucephala clangula*), bufflehead, wood duck (*Aix sponsa*), common merganser (*Mergus merganser*), and American coot (*Fulica americana*; ARA et al. 2002). Shorebirds such as greater yellowlegs and spotted sandpiper (*Actitis macularia*) foraged on intertidal mudflats or creek edges at low tides (ARA et al. 2002).

One of the habitat associations that drew some of the highest amount of breeding and autumn bird activity was the Forested and Scrub Shrub Riparian and ruderal Pasture-Grassland association in the Green Bridge County Park (ARA et al. 2002). Yellow warbler (*Dendroica petechia brewsteri*, CSC) breeds in this and near Inverness Park and is a common fall migrant through riparian corridor (ARA et al. 2002).

As noted before, the southwestern river otter, whose numbers had once dwindled precipitously, low, appeared to have rebounded, at least within the southern portion of Tomales Bay. In addition to the burrow and signs of otter presence near the West Pasture's north levee, otter burrows have also observed near White House Pool (ARA et al. 2002). Reputedly, even Pacific harbor seals (*Phoca vitulina richardsi*) have wandered on occasion up into the estuarine reaches of Lagunitas Creek, although none have been observed since baseline studies were initiated in 2001.

Special Status Fish and Wildlife Species

As of 2005, 63 special status taxa -- two invertebrates; seven fish, one amphibian, one reptile, 50 birds, and two mammal species -- either currently or historically occurred in the Project Area (ARA et al. 2002, Stallcup and Kelly 2004, 2005). Of those 63, at least five federally endangered and two federally threatened have historically or recently been found in the Project Area – four bird species, two fish species, and one amphibian species. A list of special status species with potential to occur in the Project Area can be found in Appendix A.

The five federally endangered species observed during baseline studies or documented historically included the tidewater goby, central coast coho salmon, California clapper rail, California brown pelican (*Pelecanus occidentalis californicus*), and Least Bell's vireo (*Vireo bellii pusillus*; FE; SE). The California brown pelican

irregularly visits the Project Area in small numbers, typically foraging along Lagunitas Creek shoreline (ARA et al. 2002). As of 2003, the California clapper rail had occurred in four of the last six winters in the undiked tidal marsh north of the West Pasture, however, it has not been sighted since (ARA et al. 2002, J. Evens, ARA, *pers. comm*.). The tidewater goby had not been sighted since 1953, when it was found in Tomasini Creek in 2002 (Fong 2003). Lagunitas Creek supports one of the largest remaining central coast coho salmon populations, and this species migrates through the Project Area during winter, spring, and early summer. One federally endangered species, California freshwater shrimp, was potentially documented as occurring in Lagunitas Creek within the Project Area in summer 1999 (Pearson 2000), but identification was never confirmed, and historic and recent surveys have only found the species on the section of Lagunitas Creek some distance upstream of the Project Area in more freshwater habitats near Shafter Bridge and on lower sections of Olema Creek (Fong 2003).

California red-legged frog

Federally threatened species in the Project Area include the California red-legged frog and central coast steelhead salmon. Some of the largest remaining populations of the federally threatened California red-legged frog (*Rana aurora draytonii*) occur on the Point Reyes peninsula and adjacent areas. This species was first found in the Giacomini Ranch during the Feasibility Study (PWA et al. 1993). Since 2001, surveys have documented small to moderate breeding populations in the freshwater marsh and Fish Hatchery Creek in the West Pasture (Fellers and Guscio 2002; G. Fellers and P. Kleeman, unpub. data). In addition, the frog occurs in the Olema Marsh (G. Fellers, *pers. comm*.). As with coho, Point Reyes and the Lagunitas Creek watershed represent another important stronghold for steelhead, which has been listed as threatened within the central coast ESU (Evolutionarily Significant Unit). Another federally threatened species, chinook salmon, is also present in the Project Area: this anadromous species spawns in the Lagunitas and San Geronimo Creek watersheds, although in much lower numbers than coho or chinook (MMWD 2005).

Two federally delisted species have been observed, the Aleutian Canada goose (*Branta canadensis leucopareia*) and the American peregrine falcon (*Falco peregrinus anatum*) – the latter is still designated a state-endangered species. The American peregrine falcon regularly forages over the Giacomini Ranch and adjacent undiked marshes, while the Aleutian Canada goose occasionally roosts in the northern portion of the West Pasture (ARA et al. 2002). Green sturgeon, which has been reportedly several times in Lagunitas Creek during recent years, was recently listed as federally threatened, at least for populations spawning in the Sacramento River. Previously, the regional office of USFWS in Sacramento had developed its own list of species of regional concern, designated in this report as FSacSC. While this regional listing appears to have been dropped, the FEIS/EIR does incorporate information on these species. The Project Area has supported or currently supports 16 former federal species of regional concern.

State-listed endangered and threatened species totaled at least six, many of which were also federally listed. State-endangered species included American peregrine falcon (FD), California brown pelican (FE), California clapper rail (FE), and Least Bell's vireo. Least Bell's vireo occasionally visit riparian corridor along the southern portion of Lagunitas Creek, but they do not nest here (ARA et al. 2002). State-threatened species consisted of California black rail, bank swallow (*Riparia riparia),* and sandhill crane (*Grus canadensis tabida*). Potential breeding California black rail has been consistently present in undiked marsh north of Giacomini Ranch and, during surveys, in freshwater marsh in West Pasture (ARA et al. 2002). Sandhill crane is a very rare visitor to the flooded pastures in the Giacomini Ranch, and bank swallows also represent rare transients to the Giacomini Ranch, especially in fall (ARA et al. 2002). An additional 20 resident and non-resident taxa are on California's list of Special Concern Species, including the southwestern river otter, osprey, double-crested cormorant, American white pelican, northern harrier, yellow rail, and saltmarsh common yellowthroat (ARA et al. 2002).

CDFG has initiated a process to determine and set conservation priorities for native birds by revising the initial California Bird Species of Special Concern (BSSC) document (Remsen 1978), which subjectively described declining or vulnerable species (PRBO Conservation Science 2006). The revision process, coupled with other recent efforts to develop and implement conservation strategies, led to expansion of the Bird Species of Special Concern concept to include ranking of special concern taxa for conservation priority using objective criteria. Also, the original BSSC list included only full species but the current draft list includes full species, subspecies, and identified populations. The Project Area supports approximately 21 BSSC species. The state has also developed rarity rankings, which is preceded by the letter "S," for wildlife, with rankings ranging from presumed extinct (SX) to secure, common and widespread (S5). Ten of the species have rarity rankings.

Listed below are more detailed descriptions of federally and state listed species that are either resident or commonly occurring in the Project Area.

Tidewater Goby (FE)

The tidewater goby is a small fish that occurs along the coast of California in coastal lagoons and the uppermost brackish areas of larger bays and estuaries (Swift 2003), including several lagoons and estuaries along the Marin-Sonoma coast. Until 2002, this species had not been sighted in the Tomales Bay watershed since 1953, when it was last documented in Lagunitas Creek. In 2002, fisheries surveys found tidewater goby in a leveed section of Tomasini Creek, a downstream tributary to Lagunitas Creek and southern Tomales Bay that runs along the eastern perimeter of the Giacomini Ranch. Since then, it has been also found in a muted tidal slough in the West Pasture in 2005 and a non-tidal former slough in the East Pasture in 2006 (NPS, unpub. data).

The tidewater goby was listed as endangered in 1994 throughout its entire range. Critical habitat for this species was designated in 2000 and includes 10 coastal stream segments in Orange and San Diego Counties in southern California (65 FR 69693). In November 2006, the USFWS published a proposal to designate approximately 10,003 acres of critical habitat for the tidewater goby. The critical habitat includes land in portions of Del Norte, Humboldt, Los Angeles, Marin, Mendocino, Monterey, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Sonoma and Ventura counties in California. Included in this listing proposal are portions of the Project Area, specifically Tomasini Creek in the Giacomini Ranch East Pasture, the entire muted tidal West Pasture, and undiked portions of Lagunitas Creek and marshlands north of the Giacomini Ranch (MAR-3). The most important elements of coastal lagoons and estuary systems for support of goby are a natural hydrological regime, which results in sufficient streamflow, areas of shallow water as well as deep pockets of permanent water, sand and silt substrate, a variety of aquatic and emergent vegetation, and a diversity of prey species; and an environment free from exotic fishes (USFWS).

Until 2002, the tidewater goby had not been sighted in the Tomales Bay watershed since 1953, when it was last documented in Lagunitas Creek.

Tidewater gobies are mostly annual, but some fish may live into a second year (Swift 2003). Because gobies are small and not necessarily good swimmers compared to species such as salmon, their ability to disperse when conditions change or become adverse is poor, with recolonization occurring only if another population exists within about 6.2 miles or less (Swift 2003). Not surprisingly, recent genetic studies show that gene flow is restricted or lacking between groups of populations (Dawson et al. 2001; 2002). Because of this lack of gene flow, considerable genetic variation exists among populations in San Francisco Bay counties, including Marin (Barlow et al. 2001). Recent genetic analyses performed by Jacobs and Earl (Jacobs and Earl 2005) suggest that the Tomasini Creek population may be most closely related to those at three northern coastal marshes -- Estero de San Antonio, Estero Americano, and Salmon Creek – but that the Tomasini Creek population does appear to be genetically distinct and to have differentiated many hundreds, if not thousands, of years ago. Its life history also has implications for the stability of existing populations, with even relatively persistent and large populations such as Rodeo Lagoon having sharp interannual fluctuations in numbers from seven gobies to 100 gobies per square meter within the span of a few years (D. Fong, GGNRA, unpub. data).

As noted earlier, tidewater goby establish either in the brackish reaches of coastal creeks or in permanently or seasonally impounded coastal lagoons with a sufficient freshwater inflow to create brackish conditions. According to the USFWS, goby prefers salinities of 10 ppt, but a wide range of salinities can be tolerated, with reproduction occurring in fresh water (<0.5 ppt) up to at least 25 ppt (Swift 2003). The species may even be able to survive for a few weeks in hypersaline conditions (45 ppt; USFWS 2007, Swift 2003). Within these systems, fish tend to prefer areas without strong flood scour. Within systems, fish will move up and down the creek with seasonal movement of the brackish water zone.

Some of the largest threats to tidewater goby populations include hydrologic alterations and non-native and native predators (Swift 2003). Artificial structures that constrict or eliminate the interface zone between tidal and freshwater reaches either impact or even eliminate tidewater gobies (Swift 2003). Non-native or

introduced aquatic organisms can also negatively affect goby populations. Some of the documented freshwater and brackish water predators on goby include largemouth bass, green sunfish (*Lepomis cyanellus*), striped bass (*Morone saxatilis*), yellowfin goby, and shimofuri goby (*Tridentiger bifasciatus*; Swift 2003). Crayfish may disrupt nesting sites while digging for the eggs in the sand (Swift 2003). The native rainbow trout or steelhead, starry flounder, Pacific staghorn sculpin, and prickly sculpin have also been documented to feed on tidewater gobies in the lower Santa Ynez River and elsewhere (Swift 2003).

Within the Project Area, the species occurs in several areas, with acreage of existing tidewater goby habitat in the Giacomini Ranch totaling 11.3 acres. The most important of these based on total numbers of fish is a section of Tomasini Creek that has been bermed to run against the base of Point Reyes Mesa until it drains into Tomales Bay. The creek supports both open water and vegetated sections. Most of the creek bottom is muddy or a combination of clay and silt (G. Kamman, KHE, *pers. comm*.). The flashboard dam and culvert structure is malfunctioning and allows modified two-way flow, such that the creek is influenced by the full upper range of high tides, but does not drain completely during low tides. This maintains permanent ponding or subtidal conditions within the creek, which may have become intertidal mudflat during low tides if it had been allowed to drain completely. The tidegate, along with natural "bar" features within the creek itself, may have created a "mini-lagoon" that benefits the goby, despite the fact that the substrate and flow conditions are probably not optimal.

In 2005, tidewater goby was also found in a diked slough in the West Pasture. This slough is not a fluvial or creek system such as Tomasini Creek, but rather appears to drain freshwater surface run-off from a seasonally flowing seep present on the Gradjanski property, as well as surface run-off from overbank flooding of the pasture by Fish Hatchery Creek. It receives tidal influence from Fish Hatchery Creek, which has muted tidal flows with lower amplitude than Tomasini Creek. As with Tomasini, substrate conditions are suboptimal, with the surface substrate being muddy or a combination of clay and silt.

In 2006, tidewater goby were also found in non-tidal portions of the East Pasture. During the December 2005 storm, these fish may have been washed into the East Pasture Old Slough from Tomasini Creek when the Tomasini Creek levee breached, or they may have entered the slough from the bay. During the storm, the entire northern portion of the East Pasture was flooded and connected through elevated surface waters with Lagunitas Creek and Tomales Bay. Tidewater goby have been found outside the mouth of Tomasini Creek. Lastly, these fish may have entered the East Pasture Old Slough Pond through the one-way tidegates if the tidegates were malfunctioning and allowing water in as well as out. During surveys, dead marine fish species were discovered in the pond, suggesting that gobies probably entered from the Lagunitas Creek side of the pond. The pond is bermed off from the rest of the East Pasture Old Slough, because the Giacominis once reputedly used this area for hunting. This pond consistently has brackish water salinities, probably because the tidegates leak. As with Tomasini Creek and the West Pasture Old Slough, substrate conditions are suboptimal, with the surface substrate being muddy or a combination of clay and silt.

As with all of the creeks in the Project Area, Tomasini Creek becomes largely fresh to low brackish during the winter and early spring and well-mixed or partially stratified in the summer and fall, with advance of the "salt wedge" upstream starting in spring when freshwater flows begin to drop. By late fall, salinities near the Giacomini Hunt Lodge typically range between 15- to 23 ppt (NPS, unpub. data). While brackish conditions are maintained to some degree by Tomasini Creek, lower water salinities are sustained even during late summer and early fall when surface flows in the creek often dry up (NPS, unpub. data). Groundwater spring and seep flow from the Point Reyes Mesa appear to reduce salinities within the creek even when surface flows in Tomasini Creek cease, although some subsurface flow may persist. The strong influence of groundwater is attested by the large stand of willows that grows on the steep bluff of the Point Reyes Mesa directly to the west of the creek, as well as by hydrodynamic modeling results (KHE 2006a). Because of the seasonal nature of freshwater influence, salinities in the diked slough in the West Pasture, the West Pasture Old Slough, are typically higher than in Fish Hatchery Creek, although scouring flood flows during the winter are minimal to non-existent. Circulation patterns in this slough vary from well-mixed and brackish to saline (22.4 to 30 ppt) in the late summer and early fall to strongly stratified at times and fresh to brackish (0.2 to 24.7 ppt) in the winter through early summer. The hydrology of these areas is discussed in more detail under Water Resources.

In 2002, 12 tidewater gobies were caught in Tomasini Creek in March (ARA et al. 2002). Numbers remained fairly low in subsequent sampling conducted between 2002 and 2005, with 20 gobies caught in 2003, 22 in 2004, and six (6) in 2005 (NPS, unpub. data). Five gobies were found in the West Pasture Old Slough in November 2005, and more than 50 were found in the East Pasture Old Slough Pond in 2006 (NPS, unpub. data). In addition to goby, fish sampling revealed low to moderate numbers of some of the native predators of

goby, including prickly sculpin, staghorn sculpin, and *Oncorhynchus mykiss* (steelhead or rainbow trout). Numerous crayfish have been observed in East Pasture drainage ditches, which are separated from Tomasini Creek by the levee, and starry flounder occur in Lagunitas Creek directly downstream of the creek's mouth. Another potential predator could be bullfrog, which has been observed or heard in the creek in areas where the fish has frequently been caught.

California red-legged frog (FT)

The California red-legged frog is the largest native frog in the western United States (USFWS). It is one of two subspecies of the red-legged frog found on the Pacific coast; the other is the northern red-legged frog (*Rana aurora aurora*; USFWS). The California red-legged frog once ranged across much of California, including portions of the Sierra Nevada Mountain Range, where it is believed to be the title character of Mark Twain's famed short story, "The Celebrated Jumping Frog of Calaveras County" (USFWS). In 1865, when the story was written, red-legged frogs were the largest frogs in the state; bullfrogs were not introduced to California until 1896 (USFWS). The name of this species derives from its belly and hind legs, which are often red or salmon pink in adults (USFWS).

The California red-legged frog was federally listed as a threatened species in 1996. It has been completely extirpated from the floor of the Central Valley (Fisher and Shaffer 1996) and is nearly gone in both the Sierra Nevada foothills and in the southern quarter of its range (Fellers and Guscio 2002). In a few parts of the central Coast Range, there are still large, vigorous populations, some of which probably rival what was present 200 years ago (Fellers and Guscio 2002). Several robust populations still exist in the San Francisco Bay area (especially Alameda and Contra Costa Counties) and in the coastal drainages from San Mateo County (just south of San Francisco) south to Santa Barbara County (Fellers and Guscio 2002).

Some of the largest remaining populations in California are at Point Reyes National Seashore (Marin County) where there are more than 120 breeding sites with a total adult population of several thousand frogs (Fellers and Guscio 2002). Most of the breeding sites are artificial stock ponds constructed on lands that have been grazed by cattle for 150 years (Fellers and Guscio 2002). Interannual variability in numbers for some of the most stable populations such as Cemetery Pond in Olema Valley totals less than 25 percent (G. Fellers and P. Kleeman, USGS, *pers. comm*.). Within some of these ponds or impounded estuaries, both adult and juvenile frogs have been found in areas that are moderately saline (B. Ketcham, Seashore, *pers. comm*.). Critical Habitat for this species was recently reproposed in November 2005 and includes two proposed Critical Habitat Units in Marin County, one which encompasses the entire Drakes Estero watershed and one which appears to incorporate the Chileno and Walker Creek valleys some distance northeast of the Project Area (USFWS 2005). The Project Area is currently included in neither proposed Critical Habitat Unit (USFWS 2005).

This species is threatened within its remaining range by a wide variety of human activities including urban encroachment, construction of reservoirs and water diversion, contaminants, agriculture, and livestock grazing (USFWS 2000). While bullfrogs have frequently been called a threat, or even a primary cause of the declines, there is almost no direct evidence that this is the case (Fellers and Guscio 2002), and it is at least as likely that non-native fish (e.g., striped bass, green sunfish, catfish, mosquitofish) play a significant role in the decline of native ranid frogs (Hayes and Jennings 1986).

Red-legged frogs require aquatic habitat for breeding, but also use a variety of other habitat types, including riparian and grasslands and other upland areas (USFWS; G. Fellers, USGS, *pers. comm*.). Adults often utilize dense, shrubby or emergent vegetation closely associated with deep-water pools that pond for at least six months (~ December through June) with fringes of cattails and dense stands of overhanging vegetation such as willows as breeding and rearing habitat (USFWS). During the summer months, frogs will often move out of breeding habitat into adjacent riparian areas (Fellers and Guscio 2002). Salinity can influence suitability of habitat for red-legged frogs (Fellers and Guscio 2002). Published tolerance criteria indicate that larvae and adults can tolerate salinity levels as high as 7.0 ppt, while eggs require salinities of less than 4.5 ppt (Jennings and Hayes 1989). However, anecdotal information from the Seashore and other areas along the coast suggest that frog populations, including egg masses and tadpoles, can persist in areas with higher average salinities, possibly because frogs are using pockets or lens of freshwater in otherwise saline environments.

Historical records of red-legged frogs suggest that red-legged frogs have been present in the vicinity of the Giacomini Ranch since 1922 (Fellers and Guscio 2002). The species was first observed on the Giacomini Ranch during baseline wildlife surveys conducted during 1993 (PWA et al. 1993). A few individuals were observed in a drainage ditch in the East Pasture (PWA et al. 1993). Surveys conducted in the fall, winter, and

spring of 2001-2002 showed that, while a few frogs were found in most areas, the main concentration was in the freshwater marsh in the West Pasture adjacent to Fish Hatchery Creek and, to a lesser extent, in Fish Hatchery Creek itself (Fellers and Guscio 2002). Acreage of the West Pasture freshwater marsh totaled 7.2 acres, all of which is potential red-legged frog breeding habitat. Another approximately 1.0 acre of breeding habitat occurs in portions of Fish Hatchery Creek. In 2001-2002, 21 adult frogs were detected in the freshwater marsh, and 18 adult frogs, in Fish Hatchery Creek (Fellers and Guscio 2002; Table 19). Based on the number of egg masses observed, Fellers and Guscio (2002) estimated the total number of adult frogs during that season in the West Pasture at 90-100 individuals In the East Pasture, adult red-legged frogs were sparsely distributed and unlikely to breed (Fellers and Guscio 2002). A total of six (6) sightings occurred in the East Pasture, and no eggs or tadpoles were observed (Fellers and Guscio 2002). During the summer, frogs moved out of the freshwater marsh, possibly into the riparian corridor along Sir Francis Drake Boulevard or across the street (Fellers and Guscio 2002), although it is possible that the frogs are also using the extensive pastures within the Giacomini Ranch (G. Fellers, USGS, pers. comm.).

The following winter, culverts on Fish Hatchery Creek at the north levee collapsed, allowing more tidal inflow into the West Pasture and the freshwater marsh. The culverts were repaired in fall 2003, reducing tidal inflow, but only a few adults and no egg masses or tadpoles were observed in the West Pasture freshwater marsh and Fish Hatchery Creek during the 2003-2004 season (G. Fellers, USGS, *pers. comm*.). Since then, frog numbers have increased slightly, but not to 2001-2002 levels (Table 19). In 2004-2005, approximately 10 adult red legged frogs were detected, but no egg masses were observed (G. Fellers and P. Kleeman, USGS, unpub. data). In January 2006, a survey following the second largest recorded storm in history found 12 adult frogs and 15 egg masses (G. Fellers and P. Kleeman, USGS, *pers. comm*.). For 2005-2006, approximately 32 adult frogs were assumed to be present based on the presence of approximately 16 egg masses for the season, and in 2006-2007, numbers grew to approximately 66 adults based on the presence of 33 egg masses (G. Fellers and P. Kleeman, USGS, *pers. comm*.).

As was discussed under Water Resources, salinity intrusion into the West Pasture currently appears to be controlled by extreme high tide events and long residence time during winter months, not by evapotranspiration during the summer months, as might be expected. Extreme high tides in Tomales Bay exceeding approximately 6.2 ft NAVD88 cause water levels within the muted tidal West Pasture to increase to 5.25 ft NAVD88, the uppermost part of the tidal range in the pasture, which then allows tidal waters to overbank flood and flow into the central and lowest elevations portions of the freshwater marsh. The southern half of the marsh does not appear to be affected by salinity intrusion, perhaps because of high perennial freshwater inflow from the 1906 Drainage and because elevations are higher. Interestingly, despite the availability of suitable habitat in the southern portion of the marsh, most of the frogs detected are in the central portion of the marsh (P. Kleeman, USGS, *pers. comm*.), which suggests either that breeding attempts ultimately may not be successful or that the frogs are somehow find pockets or lens of freshwater that enable egg masses and tadpoles to persist successfully. Bullfrogs and bullfrog tadpoles were observed in certain portions of the East Pasture, but not in the West Pasture until 2006. In the West Pasture, black-crowned night herons might be one of the potential red-legged frog predators (Fellers and Guscio 2002).

Red-legged frog adults and tadpoles also occur in what is believed to be low to moderate numbers at Olema Marsh, particularly along its western perimeter where there are sizeable small drainage and seep influences (G. Fellers, USGS, *pers. comm*.). However, the exact size of this population is unknown (G. Fellers, USGS, *pers. comm*.). There are significant numbers of bullfrogs (G. Fellers, USGS, *pers. comm*.). Acreage of breeding red-legged frog habitat totaled 39.8 acres, which represents the entire marshy portion of Olema Marsh. The adjacent riparian area provides potential over-summering habitat for red-legged frog, but the grasslands to the east along the shutter ridge may be too dry.

TABLE 19. CALIFORNIA RED-LEGGED FROG BREEDING IN WEST PASTURE FRESHWATER MARSH AND ADJACENT FISH HATCHERY CREEK

Year	Adults	Egg masses	Minimum adults present
2001-2002	18	45	90
2002-2003	No night or egg mass surveys during breeding season		
2003-2004	4	-	4
2004-2005	10	-	10
2005-2006	12	15	32
2006-2007	43	33	66

Central California coast coho salmon (FE), central California steelhead (FT), and coastal California chinook salmon (FT)

Central California coast Coho, Central California coastal steelhead, and southern Oregon/California coastal chinook salmon occur in several creeks on the Point Reyes peninsula and in the Lagunitas Creek watershed that drains portions of the Seashore and GGNRA, as well as MMWD, state park, and private lands. Chinook salmon have been documented primarily in the Lagunitas Creek-San Geronimo Creek watersheds (MMWD 2005).

Central California coast coho salmon was first listed as a threatened species in 1996, although it was reclassified in August 2005 as endangered. Its ESU includes all naturally spawned populations of coho salmon from Punta Gorda in northern California south to and including the San Lorenzo River in central California, as well as populations in tributaries to San Francisco Bay. Critical habitat for this species was designated in 1999 and includes all river reaches accessible to listed coho salmon from Punta Gorda in northern California south to the San Lorenzo River in central California. Designated critical habitat for coho in the Seashore includes all accessible estuarine and stream areas in the coastal watersheds of Marin County except areas above longstanding, naturally impassable barriers or above Peters Dam on the mainstem of Lagunitas Creek and Seeger Dam on Nicasio Creek (NOAA-Fisheries 1996).

Lagunitas Creek watershed, including Olema Creek, was believed to support 10 percent of the remaining coho population

Steelhead was listed as a threatened species in 1997. The steelhead ESU includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and drainages of San Francisco and San Pablo. Critical Habitat for the federally threatened central coast steelhead salmon population went into effect in January 2006 and is designated to include all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays. In Tomales and Drakes Bays, Critical Habitat does not include areas upstream of Peters Dam, Seeger Dam, and Soulajule Dam.

California coastal chinook salmon was initially listed in 1999 as federally threatened and was redesignated in August 2005. Critical habitat for this species also became effective in January 2006 and includes many watersheds on the northern California coastline extending down to the Russian River watershed, but not as far south as Tomales Bay. Chinook salmon that spawn in the Tomales Bay watershed are believed to be strays from the Russian River population (B. Ketcham, Seashore, pers. comm.), although chinook fry have historically been planted in the Lagunitas Creek watershed, as well (ARA et al. 2002).

Coho, steelhead, and chinook salmon are anadromous fish species. Anadromous species spend a portion of their life cycle in marine waters and a portion, specifically spawning and rearing, in fresh waters. There are differences between steelhead, coho, and chinook salmon life cycles. While virtually all coho in western Marin County watersheds have an 18-month freshwater life cycle, steelhead juveniles may migrate to the ocean after 18 months or extend freshwater residence for up to three years. Most coho return to spawn after 18 months, but steelhead may spend several years in the ocean before returning to spawn. Additionally, steelhead may make several spawning migrations while all coho spawn once and die. Most juvenile chinook along the California coast migrate out to sea within the first year of their life (i.e. "ocean-type" chinook) and spend three years in the open ocean (Nielsen Monterey Marine Sanctuary website). Some chinook, however, spend more than one year in freshwater bays or estuaries before moving into the ocean environment (Healey 1991) *in* (Nielsen) website).

Coho salmon and steelhead use the upper portions of coastal creek watersheds for spawning and rearing. Coho salmon tend to prefer relatively low-gradient systems with larger watersheds. Chinook salmon will spawn in either mainstem portions of rivers and creeks or tributaries. All species spawn in gravelly portions of streams where particle-size distribution enables eggs that are laid to remain adequately oxygenated. From anywhere from one to three years later, the juveniles migrate downstream into the lower estuarine areas where they remain for a period of time, foraging and adjusting to the saltwater before migrating into the open ocean. Spawning adults also spend some time in downstream or estuarine reaches of creeks, while they wait for the appropriate flow conditions in associated tributaries.

Most historic information on salmonid numbers in the Tomales Bay watershed is anecdotal. These historic accounts suggest that salmonids were abundant in the Tomales Bay watershed before extensive alteration by dam construction, logging, and stream channelization and that runs were sizeable enough to support a fishery in the bay at the end of the 1800's. Local residents recounted stories of "salmon runs" and "excellent trout fishing" along Lagunitas and Olema Creeks, which actually may refer to young steelhead, often indistinguishable from rainbow trout during the three-year period they typically spend in fresh water. Interviews with long time residents and fisheries managers suggest that coho and steelhead in the Point Reyes area have been declining since the turn of the 20th century, with significant declines occurring as late as the mid-1950's. At the time listing was being considered for coho, steelhead, and chinook salmon, the Lagunitas Creek watershed, including Olema Creek, was believed to support 10 percent of the remaining coho population (Brown et al. 1994; NOAA-Fisheries 1996).

For most drainages, only data on coho salmon abundance have been gathered. Watershed monitoring efforts have documented a general trend in increased juvenile coho salmon in Lagunitas Creek and other Tomales Bay and coastal Marin drainages, although there have been years with fewer fish such as 1998-2000 and 2002-2003 (Seashore*, in prep*.; MMWD 2006). In Lagunitas Creek, juvenile coho numbers have ranged between approximately 4,500 in 2004 and 8,500 in 2005 since 2001, with numbers generally increasing (MMWD 2006). Juvenile surveys for 11 years have resulted in estimates of 4,818 ± 2,850(SD) per year and 27,091 ± 7,169 (SD) for steelhead (MMWD 2006). In Olema Creek, one of the largest tributaries to Lagunitas Creek, juvenile coho numbers have ranged between approximately 3 fish per square meter in 1998-1999 and approximately 50 fish per square meter in 2001-2002 (Seashore, *in prep*.). Spawner surveys for 10 years have resulted in estimates of 251 ± 117 (SD) coho redds per year in the Lagunitas Creek watershed (MMWD 2005). Coho spawning on the mainstem takes place largely in Samuel P. Taylor State Park, upstream of Seashore- and GGNRA-administered lands (Trihey & Associates 1994; 1996; 1997). Coho numbers appear to be strongly affected by changed ocean productivity patterns associated with the Pacific Decadal Oscillation, which shifted from the Alaska Current to the California Current in the late 1990s (Seashore, *in prep*.).

The presence of anadromous species such as steelhead and coho salmon in the southern portion of Tomales Bay is typically restricted to adults that are migrating into the upper watersheds for spawning and outmigrating smolts. Most of these species are moving through Lagunitas Creek on their way up or out of the upper portions of the Lagunitas and Olema watersheds. The Project Area, then, provides primarily transitional habitat for salmonids currently that are either migrating upstream to spawn or outmigrating to the estuary and, eventually, the ocean. Many salmonids in other systems use estuaries for rearing for an extended period before migrating to sea (Reimers 1973; Simenstad et al. 1982)and estuarine marsh channels are used by some salmonids as nursery habitats (Levy and Northcote 1982; Simenstad et al. 1982). Research conducted by fisheries scientists in the Skagit delta and elsewhere shows that estuarine habitat is extremely important in the life cycle of wild chinook salmon (Aitkin 1998), although its importance for coho salmon appears to be more geographically and temporally variable(Magnusson and Hilborn 2003; Miller and Sadro 2003). In some northern and central California systems that close annually due to decreased freshwater flow and migrating sandbars, fall runs of chinook salmon are literally forced to rear in estuaries during the summer until fall rains reopen the mouth (Busby and Barnhart 1995).

Whether for a few days or a few months, most anadromous fish use the heavily vegetated side channels and blind (dead-end) sloughs of a healthy estuary to escape predators and acclimate to salt water (Simenstad et al. 1982). When estuaries are leveed, juveniles are forced into main channels where water is deep, currents are strong, food is scarce, and predators can easily find them. Use of marshes in Tomales Bay has not been as well studied, and construction of levees and tidegates within the Project Area preclude use of the Giacomini Ranch East Pasture and may restrict the amount of use in muted tidal areas. A list of the infrastructure and management practices that negatively affect both the opportunity for salmonid passage and rearing/refugia and capacity to support salmonids, even if opportunity exists, can be found in Table 8 under Water Resources. Dams, culverts, tidegates, and flashboard dam structures eliminate or restrict the opportunity for salmonids to move upstream to spawning areas, while levees, floodplain development, channel excavation, and channelization activities restrict opportunity for development of off-channel refugia such as secondary channels that can be used by fish during spawning or outmigration in both upstream and downstream reaches. Even if opportunity exists, the capacity of these systems to support salmonids can be negatively affected by trapping of sediment by dams, water diversions, pollutant discharges to creeks, increases in turbidity associated with channel excavation, and other factors that affect the potential for salmon to thrive. One measure that has been developed to assess the potential for an estuarine system to provide refugia and foraging opportunities for salmon is total aquatic edge or the linear perimeter of creek provided by a wetland.

Currently, approximately 14.9 miles of aquatic edge would appear to be available to salmonids for foraging, refugia, and other uses in the Project Area.

The presence of the red-legged frog restricted the ability to conduct electrofishing surveys for federally endangered and threatened salmonids during baseline wildlife surveys, but O*ncorhynchus mykiss* juveniles – presumed to be steelhead -- have been observed on Fish Hatchery Creek and Tomasini Creek on several occasions (ARA et al. 2002, NPS, unpub. data). Both Fish Hatchery and Tomasini Creeks reputedly had historic runs of steelhead. Populations of coho salmon are unlikely to have occurred in at least Fish Hatchery Creek, because of the small size of the watershed and the high stream gradient (B. Ketcham, Seashore, *pers comm*.). The lower portion of the watershed that falls within the Giacomini Ranch does not provide appropriate spawning habitat conditions (i.e., no riffle/pool complexes with appropriately sized gravel in riffles, etc.).

A few coho juveniles were found in Tomasini Creek in summer 2005 (NPS, unpub. data), although long-term sustainability of any spawning population is uncertain due to the sharp drawdown of water in the creek that occurs most summers. Information on anadromous species runs in Bear Valley Creek is also poor, but smolt trapping by the Seashore upstream of Olema Marsh in 1999 netted 21 steelhead – five of which were classified as pre-smolts (Ketcham, *in prep.*). Coho salmon have not been observed, at least in recent times, in the Bear Valley Creek watershed (B. Ketcham, Seashore, *pers. comm*.).

In addition to these smaller tributaries, steelhead and coho juveniles also occurred in the mainstem of Lagunitas Creek during summer surveys in 1999 and 2005 (Pearson 2000); NPS, unpub. data): these are probably juveniles and smolts that are outmigrating to Tomales Bay and the Pacific Ocean. Chinook salmon have not been documented in the Project Area, although they must migrate through the Project Area on their way to spawn in the upper reaches of Lagunitas Creek and San Geronimo Creek.

California black rail (ST)

The California black rail is listed as threatened under the California ESA. Black rails primarily use tidal salt marsh habitat, but they are also observed in freshwater marsh (Grinnell and Miller 1944; Manolis 1978; Evens and Page 1986; Evens et al. 1991; Aigner et al. 1995).

The species' range is currently confined to the northern San Francisco Bay Estuary, with small, isolated populations along the outer coast in Tomales Bay, Bolinas Lagoon, Morro Bay, and Bodega Bay (Manolis 1978, Evens et al. 1991); in the Sacramento Valley and foothills (Aigner et al. 1995); and in the Colorado River basin (Evens et al. 1991). However, these locations outside the San Francisco Bay are believed to support less than 10 percent of the total population, and, because of fragmentation and small sizes of these populations, they are susceptible to stochastic extinctions (Evens et al. 1991).

Former breeding populations in Central and South San Francisco Bay and the coastal marshes of southern California are apparently extirpated (ARA et al. 2002). The historic and ongoing pressures of agriculture, salt production, and urbanization has reduced tidal marshlands of San Francisco Bay by an estimated 85 percent (Goals Project 1999), and there has been a concomitant reduction in Black Rail populations supported by that habitat (Evens et al. 1991). Early in the 20th century, black rails were apparently very common in the tidal marshes of Tomales Bay near Point Reyes Station (Grinnell and Miller 1944). This population suffered habitat loss and undoubtedly a great reduction in numbers following diking and draining of these marshlands in the mid-1940s with the development of the Giacomini Ranch (ARA et al. 2002).

As of 1994, the undiked marsh north of the Giacomini Ranch appeared to support a breeding population of at least seven pairs of California black rails (Evens and Page 1986; Evens and Nur 2002). Breeding individuals have also been detected in intermittent years at Olema and Bear Valley Marshes, immediately south of the Giacomini Ranch (ARA et al. 2002). During baseline surveys, black rails were detected in the Giacomini Ranch and in Olema Marsh (ARA et al. 2002). Territorial black rails were calling on territories in May-June 2002 and were assumed breeding in the West Pasture freshwater marsh (ARA et al. 2002). Small numbers (1-2 individuals) also occurred within the Project Area in brackish and freshwater marsh (ARA et al. 2002). There is no recent information since 2001-2002 on the number of breeding pairs, although it is possible that numbers have decreased (J. Evens, ARA, *pers. comm.).* Isolated satellite populations such as Tomales Bay would be expected to have high variability – perhaps as much as 50 percent variance – in annual numbers of rails (J. Evens, ARA, pers. comm.). Some of these populations may function as meta-populations such that a local sub-population may go extinct some years, only to be re-colonized in subsequent years by strays from

San Francisco Bay (J. Evens, ARA, *pers. comm*.). The high rate of predation that occurs in the Tomales Bay population likely exacerbates the meta-population effect.

Within the San Francisco Bay region, black rails tend to occur in larger undiked marshes associated with larger rivers and in some bayshore parcels, particularly those associated with the mouths of rivers of creeks (Evens et al. 1989). A single pair of rails can occupy and breed in marshes as small as 1.2 acres, however their ability to persist and to sustain a population would be reduced in such a small area and would be dependent on contiguity to other habitat (J. Evens, ARA, *pers. comm*.). A significant positive relationship exists between marsh size and both presence and density of rails (J. Evens, ARA, *pers. comm*.). In a large, productive marsh, black rail territories may be small, i.e. < 1.2 acres. There is no information on breeding territory size for black rails in Tomales Bay, but a recent San Francisco Bay-wide study assessed average territory size for a number of marshes (Herzog et al. 2004) . Mean number of breeding birds in San Francisco Bay marshes averages 0.11 individuals per acre, although variation in the mean number of breeding birds per hectare in marshes was fairly high, ranging from 0.02 to 0.26 individuals per acre (Herzog et al. 2004).

Unlike clapper rails, black rails both forage and nest in the mid- to high marsh plain, well above the low marsh and intertidal mudflats favored by clapper rails. Relationships between black rail presence and habitat variables in San Francisco Bay include vegetation height, presence of alkali heath (an indicator of high elevation marsh habitat), and absence of amphipods (indicators of lower elevation marsh). The condition of transitional vegetation along the upland edge adjacent to marshes is also a factor in habitat suitability for rails (Evens and Page 1986). Other variables that help explain the patchy distribution of black rails in tidal marshes of the San Francisco Bay region are patch size, patch distribution (contiguity), patch configuration (linear vs. broad), predator populations, hydrological cycles, and fluctuations in water level (Evens et al. 1989; Evens et al. 1991; Flores and Eddleman 1993). During higher high tides, black rails move to higher elevations in marshes or adjacent upland areas to escape floodwaters, because rails are poor fliers and unable to fly long distances. To minimize predation pressure, high tide refugia habitat needs to be above the higher high tide water levels and well-vegetated with at least medium-sized plants to provide cover from predators that use high tides as an opportunity to prey on rails (J. Evens, ARA, *pers. comm*.). Black rail habitat in the Project Area and adjacent undiked marsh to the north of the Giacomini Ranch currently totals 120 acres, with approximately 39 acres of refugia habitat, some of which is the Giacomini Ranch levees. Within the immediate Project Area, black rail habitat totals approximately 59.3 acres with 32.4 acres of high tide refugia. While the levees are well above most of the higher high tides, they are often poorly vegetated due to trampling from cattle and people and are subject to disturbance pressures from people seeking to view the rails who may inadvertently flush them into the open where they are vulnerable to predation.

California clapper rail (FE, SE)

The California clapper rail is one of the largest rails (family Rallidae), measuring 13-19 inches from bill to tail (USFWS). The California clapper rail was designated as Endangered throughout its entire range in 1970 (35 FR 16047). A joint Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan was published in 1984, and both species will be included in the Tidal Marsh Ecosystem Recovery Plan, currently under review (USFWS). No Critical Habitat has been designated for this species. The California clapper rail is also designated as Endangered by the state, along with two other subspecies (*levipes* and *yumanensis*) that do not occur locally (CDFG 2005).

Although once more widely distributed along the California coast, present distribution is restricted almost exclusively to the emergent salt and brackish tidal marshes of San Francisco Bay and the Suisun Delta (ARA et al. 2002). Recent records from coastal estuaries outside of San Francisco Bay are sporadic and represent presumed dispersants or vagrants (ARA et al. 2002). The constriction of the clapper rail's range appears to have resulted from numerous factors, including diking or development of habitat, freshwater habitat conversion, habitat fragmentation, lack of high-tide refugia, mercury accumulation in eggs, and increase in predators such as the non-native red fox and Norway rat (*Rattus norvegicus;* USFWS).

Throughout their distribution, California clapper rails occur within a range of salt and brackish marshes. Clapper rails have rarely been recorded in non-tidal marsh areas (USFWS). In south and central San Francisco Bay and along the perimeter of San Pablo Bay, rails typically inhabit salt marshes dominated by pickleweed and Pacific cordgrass (USFWS). In the north Bay (Petaluma Marsh, Napa-Sonoma marshes, Suisun Marsh), clapper rails also live in tidal brackish marshes which vary significantly in vegetation structure and composition (USFWS). Use of brackish marshes by clapper rails is largely restricted to major sloughs and rivers of San Pablo Bay and Suisun Marsh, and along Coyote Creek in south San Francisco Bay (USFWS). As

with black rails, marsh size is positively correlated with the presence and density of clapper rails: research has shown that approximately 250-acre marshes are needed to support optimal densities, but smaller marshes (~2.5 – 5 acre minimum) will support clapper rails, especially when adjacent to larger marshes (J. Evens, ARA, *pers. comm*.). Clapper rails tend to prefer marshes with an intricate, dendritic slough network composed of very small or fourth order creek channels (ARA et al. 2002). Low marsh areas with sparse vegetation, mudflats, and tidal sloughs are important foraging areas for rails (ARA et al. 2002). Higher marsh areas with dense vegetation are used for nesting and high-tide refugia (Albertson and Evens 2000).

In the early 1900s, when tidal marshes were more extensive, clapper rails were reported as occurring in Tomales Bay (Grinnell and Miller 1944). In 1980, one bird was heard in the portion of the East Pasture adjacent to Tomasini Creek (J. Evens, unpub. field notes). Since then, the species has been largely absent, although individuals were sighted for years in the undiked marsh north of the Giacomini Ranch during fall and winter between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). There are no recent breeding records, however. Except for the "intermittent presence of wandering or wintering birds," the population of clapper rails in Tomales Bay appears to be extirpated (ARA et al. 2002), despite the fact that the northern portion of the Project Area and the adjacent undiked marsh offer at least 116.8 acres of foraging and nesting habitat, in addition to the 39 acres of high tide refugia.

California freshwater shrimp (FE)

The California freshwater shrimp was listed by the USFWS as endangered (55 FR 43884) in 1988. This species is the only extant member of the genus (Fong 2003).

The shrimp is found in low elevation (<116 m), low-gradient (generally <1 percent slope) perennial freshwater streams where banks are structurally diverse with undercut banks, exposed roots, overhanging woody debris, or overhanging vegetation (Fong 2003). As its name would suggest, California freshwater shrimp is believed to occur only in freshwater conditions (<0.5 ppt) within streams in the watershed, although it may be able to temporarily tolerate increases in salinity of up 16 to 17 ppt (USFWS 1998).

The shrimp is endemic to 17 coastal streams in Marin, Sonoma, and Napa counties north of San Francisco Bay, California (Fong 2003). Within the Seashore and GGNRA, the shrimp is found exclusively within the Lagunitas Creek watershed. It has also been found in Walker Creek in Tomales Bay (Serpa 1992). The shrimp was first observed and collected in Lagunitas Creek in 1877 (Hedgpeth 1975). The current, known range of the shrimp within Lagunitas Creek extends from Shafter Bridge in Samuel P. Taylor Park to roughly 1 mile below the confluence with Nicasio Creek (Hedgpeth 1975; Serpa 1991). Near the Project Area, the shrimp has been found in lower Olema Creek (Fong 1999).

As part of baseline surveys for the proposed project, habitats were surveyed using a qualitative ranking system developed by Serpa (1996) to evaluate habitat suitability of streams for shrimp. This system evaluates features known to be important to shrimp such as water depth, presence or absence of undercut banks, etc (Fong 2003). All surveyed habitats within the project area were generally rated as either "fair" or "poor" sites for shrimp, and no California freshwater shrimp were captured during surveys in September 2001 (Fong 2003). Many of the required habitat components were either absent or not available on a consistent basis (Fong 2003). The presence of the introduced mosquitofish in the ditches and creeks in the Giacomini Ranch pastures likely precludes the presence of freshwater shrimp.

In Lagunitas Creek itself, operation of the gravel summer dam for more than 50 years would seemingly have increased the amount of habitat for shrimp, as dam impounded freshwater for more than 1 mile upstream of the Green Bridge. However, the warm temperatures within the "pool" attracted a significant number of non-native fish (Bratovich and Kelley 1988) that may have preyed upon freshwater shrimp, thereby decreasing the quality of the habitat (Pearson 2000).

Two years after the dam was permanently removed, Pearson (2000) reported finding three individuals of California freshwater shrimp during surveys between April and August 1999 in "freshwater" conditions, with two individuals found near the location of the old summer dam underneath overhanging riparian trees. However, it is unclear from the report whether identification of these individuals was positively confirmed, and not much information was included in the report as to exactly when the individuals were caught. Fong (2003) and subsequent surveys (NPS, unpub. data) have repeatedly found non-native brackish water or Korean shrimp (*Palaeomon macrodactylus*) in Lagunitas Creek upstream of White House Pool near the old summer dam location.

Threats to existing populations of freshwater shrimp include "introduced fish, deterioration and loss of habitat resulting from water diversion, impoundments, livestock and dairy activities, agricultural activities and developments, flood control activities, gravel mining, timber harvesting, migration barriers, and water pollution" (USFWS 1998). All of these threats have historically occurred along Lagunitas and Olema Creeks.

California brown pelican (FE)

California brown pelican was listed as federally Endangered in 1970. It commonly occurs on local estuaries and nearshore waters as a non-breeding visitor, particularly during summer and fall, with several hundred individuals sometimes present in Tomales Bay (ARA et al. 2002). Winter numbers in Tomales Bay are lower, ranging as high as 56 (Kelly and Tappen 1998). It irregularly visits the Project Area in low numbers, most commonly in the fall when it forages on the shoreline of Lagunitas Creek near its mouth (ARA et al. 2002).

Least bell's vireo (FE, SE)

The Least Bell's vireo was once widespread throughout California, but its numbers have declined precipitously. It inhabits riparian woodlands with tall trees and shorter thick shrubs. In 1980, the state of California listed this species as endangered, and in 1986, the USFWS followed suit. At one point, the vireo was known to breed from interior northern California near Red Bluff in Tehama County south through the Sacramento and San Joaquin valleys and Sierra Nevada foothills and in the coastal ranges from Santa Clara County south to the approximate vicinity of San Fernando in Baja California. Currently, its breeding range is in Southern California, with large populations in Riverside and San Diego counties and smaller populations in Santa Barbara, Ventura, and San Diego counties and in northern Baja California. In early 1994, USFWS designated about 38,000 acres at 10 localities in portions of six counties in Southern California as "critical habitat." The vireo is threatened by loss and degradation of its habitat through human and human-induced activities and by nest parasitism of the brown-headed cowbird (*Molothus ater*). Adverse impacts to vireo habitat result from clearing and other impacts to riparian habitat. This species occurs as an extremely rare vagrant in riparian corridor along southern end of Lagunitas Creek (ARA et al. 2002).

Green sturgeon (FT)

In April 2005, the National Marine Fisheries Service, which oversees recovery of marine and anadromous fish under ESA, listed the southern San Francisco-Sacramento River population of green sturgeon as federally threatened. The northern population, which extends from the Klamath River to the Columbia River estuary, was not included.

Sturgeon is the largest and possibly the oldest fish found in freshwater (ARA et al. 2002). Green sturgeon can reach 7.5 feet in length and weigh up to 350 pounds (ARA et al. 2002). This large anadromous fish ranges from Alaska to Mexico in marine waters and feeds in estuaries and bays from San Francisco Bay to British Columbia (ARA et al. 2002). It spawns in fresh water in the mainstem of large rivers, with the only remaining spawning populations being in the Sacramento and Klamath River basins in California and possibly in the Rogue River in Oregon (ARA et al. 2002). Sturgeons in general are highly vulnerable to habitat alteration such as damming, diversion, and pollution and activities such as over-fishing because of their specialized habitat requirements, the long time it takes them to reach breeding maturity, and their sporadic reproductive success (ARA et al. 2002).

Green sturgeon is recorded from Tomales Bay (Blunt 1980; TBA 1995) and may enter Lagunitas Creek to forage, as do white sturgeon (ARA et al. 2002).

American peregrine falcon (SE, FD)

One of the most widely distributed of warm-blooded terrestrial vertebrates, the peregrine falcon occurs in an amazing diversity of habitats all over the world, which lends credence to its name, which means "wanderer" (White et al. 2002). The peregrine was a cause célèbre of the environmental awakening of the 1970s (White et al. 2002). Although it was thought to be a globally declining and endangered species, numbers were later found to be greater than originally thought, although it was greatly harmed by the widespread use of persistent chemicals such as DDT that lowered reproduction and survival rates (White et al. 2002). By 1970, the peregrine was federally protected in the United States, and peregrines have since made a strong recovery (White et al. 2002).

During the past 20 years, the peregrine falcon population in San Francisco Bay has increased ten-fold, with 10-20 birds in the estuary (SFEP 2004). While the population is increasing, success of reproduction efforts is questionable (SFEP 2004). One factor that has increased this species' popularity is its propensity to nest in very urbanized areas. San Francisco Bay Area has seen the appearance of urban peregrines on a small scale, with birds nesting on or frequenting the Bay Bridge, buildings in downtown San Francisco, and the Golden Gate Bridge (Bell 1994). In Tomales Bay, the peregrine falcon may potentially breed in the Seashore. It has been regularly observed foraging over the Giacomini Ranch and the undiked marsh to the north (ARA et al. 2002).

Sandhill crane (ST)

The sandhill crane is one of only 15 species of cranes in the world and is one of just two crane species native to North America. They are also the oldest living species of bird, with fossils dating back over 6 million years (Save the Bay 2005). One subspecies of crane that spends the winter in California's Central Valley is the greater sandhill crane (Save the Bay 2005). At approximately five feet tall, the greater sandhill crane is one of the tallest birds in the world (Save the Bay 2005). Listed by state as threatened, the survival of the greater sandhill crane is imperiled by habitat loss and degradation (Save the Bay 2005). Within Tomales Bay, sandhill cranes are very rare visitors to wet pastures on the Giacomini Ranch (ARA et al. 2002).

Bank swallow (ST)

The Bank Swallow is one of the most widely ranging of all the species in the swallow family. It is migratory, breeding in western North America on around to eastern Eurasia, while in the winter, it moves south into Central and South America or into Africa and Central Asia. As its name night suggest, the bank swallow is a colonial nesting bird which normally nests along river "banks," but due to human encroachment, they have altered their nest site selection to utilize quarry slag piles and, in San Francisco, sand bluffs in close proximity to freshwater marsh areas.

The species has been listed as threatened by the state because of habitat loss in the Central Valley (Murphy 2006). Once widespread on the coast, this species is now limited to two confirmed colonies, one of which is a single site in the exposed bluffs of the Merced Formation at Fort Funston facing the ocean (Murphy 2006). In Tomales Bay, this species is a rare transient over the Giacomini Ranch, especially in the fall (ARA et al. 2002).

Threats from Non-Native and Invasive Wildlife Species

Non-native and invasive wildlife species can completely alter ecosystem dynamics and the value of aquatic system to native species, as Tomales Bay's neighbor to the east, San Francisco Bay, has demonstrated over the past several decades.

The San Francisco Estuary can now be recognized as the most invaded aquatic ecosystem in North America (Cohen and Carlton 1995). It has 212 introduced species, 69 percent of these are invertebrates, 15 percent are fish and other vertebrates, 12 percent are vascular plants, and 4 percent are protests (Cohen and Carlton 1995). In the period since 1850, the San Francisco Bay and Delta region has been invaded by an average of one new species every 36 weeks, increasing in 1970 to one new species every 24 weeks (Cohen and Carlton 1995). In the state as a whole, nearly half of all freshwater species are introduced (TBWC 2002).

In addition to extirpating native species such as the Sacramento perch from some portions of its range, invasive species are also completely altering the bottom portion of the San Francisco Bay food chain (Cohen and Carlton 1995). Phytoplankton populations in the northern reaches of the Estuary may now be continuously and permanently controlled by introduced clams, with the Asian clam (*Potamocorbula*) filtering the entire water column over the channels more than once per day and over the shallows almost 13 times per day (Cohen and Carlton 1995). In addition to phytoplankton, the Asian clam also consumes bacterioplankton, phytoplankton, and zooplankton (copepods), and so may substantially reduce copepod populations both directly and indirectly (loss of food source). The dramatic decline in copepod population, in turn, could cause collapse in the native copepod-eating mysid shrimp (*Neomysis*), which are one of the major food stocks for salmon and other fisheries (Cohen and Carlton 1995).

Many consider the implications of this large-scale aquatic invasion of San Francisco frightening for Tomales Bay. Currents from Golden Gate can reach some of the estuaries and lagoons along the northern California

coast, which is how some surmise that Atlantic cordgrass and its hybrids, non-native competitors with the native Pacific cordgrass, reached Drakes Estero watershed. In addition, ballast water, the primary factor for introduction of many aquatic organisms to San Francisco Bay, can be discharged off the Marin Coast, thereby increasing the potential for introduction of these same species to Tomales Bay. The Tomales Bay All-Taxa Biological Inventory has already documented the presence of at least 28 non-natives among the 2,015 aquatic species recorded during the last three years (Seashore 2005). At least five are deemed to be a serious threat to ecosystem health and native species (Seashore 2005). Other species have spread "overland" through transportation of timber, hay, and fur or were even introduced by humans for food or recreation such as the bullfrog and warmwater fish, respectively (TBWC 2002). Some of the non-native species in the Tomales Bay watershed include the Virginia opossum (*Didelphis virginiana*), the bullfrog, the red fox, Norway rat, black rat (*Rattus rattus*), house mouse (*Mus musculus*), two species, and several fish and bird species (TBWC 2002).

Within the Project Area, several non-native and invasive species have been documented, with perhaps the ones of highest concerns being the green crab (undiked marsh north of Giacomini Ranch), bullfrog (East Pasture, Tomasini Creek, Olema Marsh), and the red fox (Giacomini Ranch-East Pasture and dairy facility). Other non-native species of concern include the yellowfin goby (Lagunitas Creek), turkeys (West Pasture), brackish water or Korean shrimp (Lagunitas and Tomasini Creeks), mosquitofish (Giacomini Ranch East and West Pastures), and crayfish (Giacomini Ranch East and West Pastures). There are also several native species in the Project Area or vicinity whose presence and/or abundance is sometimes considered detrimental, including brown-headed cowbird, a nest parasite found occasionally in Olema Marsh that disturbs the nests of other birds, and common ravens (*Corvus corax*) and American crows (*Corvus brachyrhynchos*), which prey on young of endangered and threatened bird species.

In addition to threats from non-domesticated species, feral and uncontrolled domestic animals also pose a threat to native wildlife. These animals include primarily dogs and cats in areas with more concentrated housing such as the Point Reyes area, Olema Valley, and ranches on the Point Reyes Peninsula. Feral cats have a documented and adverse effect on birds, amphibians and small mammals in native ecosystems (Winter and Wallace 2006, Liberg 1984). Other animals that can have an adverse effect on wildlife are released domesticated animals such as "slider" turtles (*Chrysemys scripta*) and other reptiles and invertebrates.

Green crab

One of the aquatic invasive species of most concern is the green crab, which is also present in San Francisco Bay. The green crab is native to the Atlantic coasts of Europe and northern Africa, where it inhabits rocky shores, sand flats, and tidal marshes (ARA et al. 2002). The green crab arrived in San Francisco Bay in 1989-1990 and has since spread as far north as Washington and as far south as Morro Bay (ARA et al. 2002).

The green crab is a food and habitat generalist, capable of eating an extraordinarily wide variety of animals and plants, including bivalve mollusks, polychaetes, and small crustaceans. Indeed, it is its status as a dietary generalist that poses perhaps the greatest threats to native species and their ecosystems. At the turn of the century, this species basically wiped out the soft clam industry of Maine and the surrounding waterways (van Heertum 2002). In California, it has been estimated to cause the loss of as much as 50 percent of Manila clam stocks and substantial decreases in other crab populations (van Heertum 2002). In Bodega Harbor, records show a significant reduction in clam and native shore crab in abundance since the arrival of the green crabs in 1993 (Grosholz et al. 2000). Beside its threat as a predator and potential disruptor of the native food chain, green crab may carry a parasite, the acanthocephalan worm, which can infect local shorebirds (CDFG 2001)*in* ARA et al. 2002).

The green crab arrived in Tomales Bay in 1995-1996. In a study done at one shellfish operation in Tomales Bay, the Manila clam (*Tapes philippinarum*) harvest showed a 40 percent drop after the arrival of green crabs (Biocontrol News and Information 1999; Grosholz and Olin 2000). Numbers were apparently high early on, but declined during some of the El Nino years in 1999-2000. In 2005, green crab numbers in one wetland area in Tomales Bay, Tomasini Estuary near Tomasini Point north of the Giacomini Ranch, were estimated as approximately 8,5000 individuals, with a density of 0.007 to 0.02 crabs per square foot (Pettigrew 2005). These densities are similar to Bodega Bay, which reportedly has densities of 0.15 crabs per square meter, but an order of magnitude lower than densities in European and Atlantic coast estuaries, which has led some (Yamada 2001) to speculate that competition and environmental factors may be limiting expansion in Pacific coast estuaries (Pettigrew 2005). In the Project Area, the green crab has been sighted primarily in the undiked marsh north of Giacomini Ranch's West Pasture.

Bullfrog

Native to the eastern United States, the bullfrog was introduced to California several times early this century (Storer 1922; Morey 1990). It is now widespread and common in the state (Bury and Luckenbach 1976). The bullfrog is the largest frog in California (Morey 1990), and it may compete with or consume the other amphibians with which it co-exists.

Highly aquatic, bullfrogs are found in quiet waters of ponds, lakes, reservoirs, irrigation ditches, streams, marshes, and other permanent water (Stebbins 1954; Morey 1990). Wright and Wright (1949; Morey 1990) listed shoreline cover and shallow water as important habitats for adults and tadpoles, respectively. Permanent water is often required for the completion of larval development. In California, breeding and egg-laying occur from March to July (Stebbins 1972 *in* Morey 1990). Tadpoles require at least six months to transform, and individuals in many populations overwinter as tadpoles and transform during their second year (Treanor and Nicola 1972) *in* Morey 1990).

Adults are opportunistic feeders taking both aquatic and terrestrial prey items. Invertebrates are the primary food of bullfrogs ((Frost 1935; Korschgen and Moyle 1955; Cohen and Howard 1958; Taylor and Michael 1971; Morey 1990), but vertebrate prey such as fish, salamanders, frogs (including bullfrogs) and tadpoles, spadefoot toads, snakes, turtles, birds, and mice are also taken. Moyle (1973) *in* Morey 1990) suggested that bullfrogs are responsible for the elimination of the red-legged frog from the floor of the Central Valley and adjacent Sierra foothills, and for reduction in the range of the yellow-legged frogs. Supporting evidence for this is sparse (Morey 1990), but bullfrogs are believed to have played some role in the decline of California red-legged frogs and other native amphibians.

Red fox

The red fox is widely distributed in lowlands in central and southern California (Johnson 1990). Introduced populations inhabit Sacramento and San Joaquin valleys and scattered coastal and inland locations from Sonoma County south to Monterey County, and east to Stanislaus County, as well as in Ventura, Los Angeles, and Orange counties (Johnson 1990). The red fox hunts small and medium-sized mammals, ground squirrels, gophers, mice, marmots, woodrats, pikas, and rabbits, but it is its affinity for hunting federally and state endangered ground-nesting species such as California clapper rail and California black rail that have raised concerns about its increasing numbers within the San Francisco Bay region and other coastal areas with rail populations (San Francisco Bay Estuary Goals Project 1999). The impact of this species on rails and other ground-nesting species is increased, because most of the remaining marshes are leveed or near levees, which the red fox readily use to access rails, and the red fox can swim, unlike its native counterpart (Goals Project 1999).

Fish and Wildlife Resources and Wetland Functionality

One of the most important or certainly most publicized functions for wetlands is to provide breeding, nesting, foraging, and refugia habitat for wildlife, as well as to support wildlife species in distant locations through export of carbon and potential food sources. Tomales Bay is tremendously important to estuarine and marine species. Despite diking and other agricultural activities, the Project Area is also currently important to wildlife, particularly avian species, although it also provides support for amphibian and fish species currently, as well. Much of the existing value of the Project Area to wildlife probably results from the fact that it is already wetland, although the diversity of wetland and upland habitats within the Project Area and immediate vicinity also appears to play a crucial role in increasing species diversity. Its value may be enhanced, as well, by the fact that the Project Area falls within one of the largest estuarine transition zones in Tomales Bay, a dynamic and often biotically diverse interface between saltwater and freshwater environments.

From a broad perspective, most of the species detected in or around the Giacomini Ranch occurred on the perimeter of the Ranch itself, where there is more habitat diversity. This habitat diversity comes primarily from the juxtaposition between not only freshwater and saltwater environments created by abundant groundwater and fluvial sources at the edge of an estuary, but between the wetland and upland environments that have been created by uplift along the San Andreas Fault and other geological processes. However, this habitat diversity also appears to stem in part from the fact that many of the Ranch's "edges" are not as highly managed for agriculture. Some of the most frequented wildlife areas on the Ranch are the West Pasture freshwater marsh, the ruderal or unmanaged field in the northern portion of the West Pasture, the riparian

corridor and seep-fed meadows along Sir Francis Drake Boulevard, the riparian scrub habitat at the Green Bridge County Park and on the Point Reyes Mesa, and the shallow shorebird habitat that has developed in one of the East Pasture's ruderal fields (ARA et al. 2002).

More than 300 acres of the 550 acres of pastures and lowland areas in the Giacomini Ranch East Pasture are actively managed though irrigation, mowing, manure spreading, grazing, and other activities. Wildlife surveys found few species actively using these managed pastures, and the few species that did were sometimes prevented from successfully because of agricultural activities (ARA et al. 2002). The primary species using the Giacomini Ranch East Pasture were roosting waterfowl or waterbirds and occasionally deer, red fox, sparrows, swallows, and small mammals such as voles and gophers (ARA et al. 2002). Within these monotypic pastures, drainage ditches and ditched sloughs did increase habitat diversity -- and thereby species diversity -- somewhat, attracting northwestern pond turtle and depauperate fish and invertebrate communities in addition to the occasional southwestern river otter, waterbird and waterfowl, and California red-legged frog. While non-native species are present in the ditches such as mosquitofish, the ditches and pastures do not appear to be heavily managed through use of herbicides or pesticides, which may increase diversity relative to other very highly managed wetlands.

Most of the species detected in or around the Giacomini Ranch occurred on the perimeter of the Ranch itself, where there is more habitat diversity.

Olema Marsh is not as highly managed as the Giacomini Ranch, which has probably increased its relative value to wildlife. Olema Marsh offers some of the same habitat diversity as Giacomini Ranch, because the marsh borders the Inverness Ridge, which contributes upland habitat, as well as groundwater and fluvial influences that sustain both the marsh and a broad riparian zone. The overall importance of this marsh to wildlife is difficult to gauge, because of the complexities involved in comprehensively surveying it. Certainly, its value to particular types of birds has been well-documented, and it does support California red-legged frog, but use by fish and invertebrates, some of which are also special status species, is uncertain. Based on historic maps, this area might have once attracted special status fish and invertebrates such as tidewater goby, coho salmon, and perhaps in freshwater portions or in very wet years, California freshwater shrimp, but these species have not been sighted in the marsh or upstream watershed. The status and future of steelhead in this system still remains questionable due to problems with the Levee Road and Bear Valley Road culverts, as well as potentially the lack of a defined flow path through the marsh (KHE 2006b).

On a larger scale, hydrologic disconnection of both the Giacomini Ranch and Olema Marsh from Lagunitas Creek has substantially decreased the potential of these areas to support or improve conditions for marine and estuarine species in other areas of Tomales Bay. The low numbers and diversity of fish and invertebrate species that do occur within the Project Area are largely unavailable to aquatic organisms within the Bay, thereby decreasing the Project Area's overall value to wildlife. Obviously, some waterbirds and raptors, as well as southwestern river otter, do forage in the Giacomini Ranch but the contribution to the larger food web within the Bay has been minimized by levees, culverts, and other hydrologic alterations. The lack of hydrologic connectivity between creek and floodplain also limits the ability of these wetlands to export carbon and to improve water quality, both of which can affect Tomales Bay wildlife. Poor water quality not only impacts the oyster industry, but it may negatively affect both diving ducks and fish-eating waterbirds, which forage on benthic invertebrates susceptible to contamination in sediment (diving ducks) or require high visibility to sight prey (waterbirds; Kelly and Tappen 1998). In addition, excessive amounts of sediment in flood flows can literally "smother" populations of benthic invertebrates that act as food source for shorebirds, which may account for several years of sharp mid-winter declines observed in certain shorebird species numbers in Tomales Bay following very large storm events (Kelly 2001).

Cultural Resources

While public awareness of the importance of wetlands appears to be a relatively recent phenomena, this awareness really reflects more of a reacquaintance with the functions, values, and "services" provided by wetlands – values and functions that were recognized for hundreds to thousands of years prior to European settlement. The bountiful resources of the Pacific Ocean and sheltered bays encouraged settlement by Native American tribes that relied on open water areas and wetlands for fish, game, shellfish, and other food resources. Many of these same peoples actually created and/or managed wetland features for specific functions and services. The Omiomi Coastal Miwok appeared to have developed large tidal marsh ponds near Novato in Marin County for waterfowl hunting, and the Yrgin Ohlone managed salt pannes in Hayward in east San Francisco Bay for salt harvesting (Goals Project 1999). These same resources were highly prized by English and Spanish explorers and later by settlers who moved into the San Francisco Bay and Point Reyes regions.

Background and Regulatory and Policy Setting

The Seashore's history of Native American settlement, European exploration, and eventual colonization by Spaniards and Americans left it a legacy of important archeological and historic resources. A more detailed summary description of the history of the Project Area can be found at the beginning of this chapter.

Since the early 1900s, a number of laws and policies have been enacted to protect cultural resources such as these for the enjoyment of future generations of park visitors. The Antiquities Act of 1906 (16 USC §432) mandated protection of historic or prehistoric remains "or any antiquity" on federal lands, including historic monuments and ruins. It was superseded by the Archeological Resources Protection Act of 1979 (16 USC §470aa et seq.) as an alternative federal tool for prosecution of antiquities violations on public lands. In addition to protecting resources, the Archeological Resources Protection Act regulates excavation and collection on public and Indian lands and requires notification of Indian tribes that may consider a site of religious or cultural importance prior to issuing a permit. The importance of consulting with Native American tribes was bolstered by passage of the American Indian Religious Freedom Act (42 USC §1996), which stresses that religious concerns should be accommodated or addressed under NEPA or other appropriate statutes. The Archeological Resources Protection Act was amended in 1988 to require the development of plans for surveying public lands for archeological resources and systems for reporting incidents of suspected violations.

The National Historic Preservation Act of 1966, as amended (16 USC §470 et seq.) requires agencies to take into account the effects of their actions on properties listed in or eligible for listing in the National Register of Historic Places. The Advisory Council on Historic Preservation has developed implementing regulations (36 CFR 800), which allow agencies to develop agreements for consideration of these historic properties. The Park Service, in consultation with the Advisory Council, the California State Historic Preservation Officer (SHPO), Native American tribes, and the public, has developed a Programmatic Agreement for operations and maintenance activities on historic structures. This 1995 Programmatic Agreement provides a process for compliance with the National Historic Preservation Act and includes stipulations for identification, evaluation, treatment, and mitigation of adverse effects for actions affecting historic properties.

In addition to federal and state laws governing protection of cultural resources, Executive Order 11593 instructs all federal agencies to support the preservation of cultural properties. It directs them to identify and nominate cultural properties under their jurisdiction to the National Register of Historic Places and to "exercise caution… to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered." The Park Service incorporated direction from law and federal policy into development of the Cultural Resources Management Guidelines (NPS 1998a), which recognizes five types of cultural resources: archeological resources, historic structures, ethnographic resources, cultural landscapes, and museum objects.

In California, authority for NHPA has been transferred to California's Office of Historic Preservation. The Office of Historic Preservation also is responsible for oversight of California Pubic Resources Codes Section 21083.2-21084.1, which requires state and local agencies to evaluate impacts of proposed projects to archaeological and historic structure resources. Federal and federally-sponsored programs and projects are reviewed pursuant to Sections 106 and 110 of the NHPA. Section 106 of the NHPA requires federal agencies to consider the effects of proposed federal undertakings on historic properties. NHPA requires federal agencies

to initiate consultation with the State Historic Preservation Officer (SHPO) as part of the Section 106 review process. The State Office of Historic Preservation maintains the California Register of Historic Places. The California Register includes resources listed in or formally determined eligible for listing in the National Register of Historic Places, as well as some California State Landmarks and Points of Historical Interest. Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the California Register and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC Section 5024.1, 14 CCR § 4850).

Tribal Lands

The recently completed Point Reyes National Seashore Cultural Affiliation report (Emberson et. al. 1999) examining Native American affiliation at Point Reyes concluded that the Federated Coast Miwok people have a clear, exclusive affiliation with the lands managed by the Seashore extending back more than 2,000 years. The Federated Coast Miwok are politically recognized by the federal government as the Federated Indians of Graton Rancheria. A FIGR representative was present for most of the archeological survey conducted in the Project Area.

Archeological Resources

Park Setting

Archeological resources are "the remains of past human activity and records documenting the scientific analysis of these remains" (NPS 1998). These include artifacts, ecofacts, and features. Over 100 Native American archeological sites exist within the Seashore, primarily on the coastal lowlands. These known prehistoric sites are primarily shell middens, voluminous deposits of rich organic soil with a relatively high content of local shell, created by human habitation of the site. The Seashore also has approximately 90 historic terrestrial archeological sites. These sites typically reflect historic occupation and use of the peninsula, first by homesteaders and dairy ranch communities, and later by government lighthouse and lifesaving personnel and private radio telecommunication companies. They include discrete trash pits containing old bottles, tins, broken tools and crockery, buried corduroy roads, ruined ranch sites, and radio communication facilities. Almost 90 percent of the Seashore's lands have not yet been surveyed for archeological resources.

Archeological Resources within the Project Area

No archaeological resources or human remains were identified during surveys conducted in 2002 by the Anthropological Studies Center at Sonoma State University (Newland 2003).

Cultural Landscapes and Features

Park Setting

Cultural landscapes "are settings we have created in the natural world" (NPS 1998). In 1998, the Seashore started developing a cultural landscape inventory database. To date, the database has identified 12 historic cultural landscapes, with the dairy and cattle ranches on the Point Reyes Peninsula comprising the single largest landscape (Seashore 2001). The smallest is located at the 19th century lime kilns located in the Olema Valley (Seashore 2001). Landscapes can range in scale from historic sites to substantial districts (Seashore 2001). They may express a high level of design, as seen in the two former RCA / Marconi Wireless Stations on Point Reyes and Bolinas, or, conversely, they may be landscapes that have arisen from need or desire over time, rather than arising from measured designs (Seashore 2001). The ranches along Lagunitas Creek and the Olema Valley fall in this category (Seashore 2001).

In total, the Seashore manages 39 cultural landscapes: 23 are within the boundaries of the Seashore, and 16 are within the North District of the GGNRA. The landscape and landscape features primarily reflect the maritime, ranching, communications, and military history of the park. Two of these landscapes are considered historic districts. The Point Reyes Ranches Historic District is the largest and encompasses over 22,000 acres on the Point Reyes Peninsula with the oldest dairy operations (1857-1939) known as the "alphabet ranches."

The Seashore has rehabilitated the NHRP-listed Pierce Point Ranch in this district. Home Ranch is listed as a landscape feature integral to the Point Reyes Ranches Historic District Cultural Landscape. Home Ranch is one of the oldest and best preserved ranches on the Point Reyes Peninsula (Livingston 1994). The Olema Valley Ranches Historic District, including the Lagunitas Creek ranches, is a smaller, but comparable district with a broader range of architectural styles and site development influenced by a higher diversity of ownership and lack of standardization (Seashore 2001).

Several other landscape features have national significance. The 1927 Point Reyes Lifesaving Station is a National Historic Landmark, and the Marconi/RCA Wireless Stations sites are in the process of being nominated as a multiple property National Historic Landmark. The Point Reyes Light Station, which was built in 1870, is listed on the NRHP. The Olema Lime Kilns are listed as a California State Historical Landmark and also as a National Register of Historic Places property.

Cultural Landscapes and Features within the Project Area

The Project Area is not located in the Seashore's two historic ranching districts (Garcia and Associates 2004), although the Martinelli Ranch, which is owned by GGNRA and directly northeast of the Giacomini Ranch, is included in the Historic Resource Zone. Surveys of the Giacomini Ranch in 2002 identified two previously unrecorded cultural landscape features: a portion of the North Pacific Coast Railroad grade (ASC-69/01-01) and a historic-period levee system and dam (ASC-69/01-02; Newland 2003). The dam was a temporary gravel dam that the Giacominis installed each summer to provide freshwater for irrigation purposes. The Giacominis stopped summer dam installation in 1998 prior to selling the property to the Park Service. While the original levee system was constructed more than 50 years ago, the degree of alteration to this system due to repairs and reinforcement (e.g., rip-rapping) will probably reduce its value as a historic resource (Mark Rudo, Park Service, *pers. comm*.). The study determined that neither resource was eligible for listing on the National Register of Historic Places (Newland 2003). In 2004, four additional landscape features were recorded by Garcia and Associates (2004): two manure lagoons and two corrals in the main complex. The corrals are not on Park Service property. None of these features was considered eligible for National Register of Historic Places listing (Garcia and Associates 2004).

Historic Structures

Park Setting

Historic structures are "material assemblies that extend the limits of human capacity" and comprise such diverse objects as "buildings, bridges, vehicles, monuments, vessels, fences, and canals" (NPS 1998). More than 300 historic structures are found on land managed by the Seashore. The structures range from simple timber-framed barns to the cast-iron Point Reyes Lighthouse to the concrete Mission Revival Marconi transmitting station. Historic structures are found throughout most of the park, except for the Wilderness Area, and mark the built history of the Seashore. Approximately two-thirds of the Seashore's listed structures are ranch structures managed under leases and permits. The remaining structures reflect the park's maritime and radio communication history.

Four sites are listed in the National Register, including the Point Reyes Lifeboat Station, a National Historic Landmark. Three additional properties have been determined to be eligible for the National Register of Historic Places, and several additional properties are in review. Within the Seashore, 297 historic structures are on the List of Classified Structures, the Park Service inventory of historic and prehistoric structures.

Historic Structure Resources within the Project Area

Historic structure surveys were conducted in 2004 to evaluate the historic buildings, structures, and landscape features at the Giacomini Dairy Facility and a separate residence on Sir Francis Drake Boulevard in Inverness Park (Garcia and Associates 2004). The study determined that the Giacomini Ranch was much younger than many of the other Olema Valley and Point Reyes dairies that operated in the 19th century and that many of the buildings had been highly modified (Garcia and Associates 2004). Neither the Dairy Facility structures nor the Inverness Park residence appeared to meet any of the criteria for listing in the National Register of Historic Places (Garcia and Associates 2004).

Public Health and Safety

In addition to hydrologic and ecological functions, wetlands also provide social services, several of which directly relate to public health and safety. Wetlands reduce impacts from floods by providing floodwater storage and decreasing the destructive energy of flood flows. While the public has become more knowledgeable about the functions and services that wetlands offer, wetlands still labor to some degree with age-old misconceptions of wetlands as swamps filled with mosquitoes, dank water, and other nuisances and dangers. Unfortunately, this view has resurfaced with growing concern about the spread of West Nile Virus and other mosquito-borne diseases and the potential impact on public health. These concerns need to be balanced with a better and more scientific understanding of the diseases, their vectors, mode of transmission, and the relationship of wetlands and other habitats to disease vectors.

Flooding and Public Safety

Regulatory and Policy Setting

Flooding has historically had severe safety and economic impacts on both urban and rural communities and even parks. Federal and local regulations have been promulgated to reduce both the exposure of communities and parks to damaging flooding and the funds required to rebuild communities and parks following such major floods (Clearwater Hydrology and Nichols-Berman 2002). Until the early to mid-1980s, the flood control and reduction strategies that were typically applied in Marin and other Bay Area counties often had detrimental impacts on aquatic, riparian and wetland habitats (Clearwater Hydrology and Nichols-Berman 2002). Growth in the understanding of the linkage between hydraulic and fluvial geomorphological processes caused a re-evaluation of some of the commonly applied flood control techniques, such as use of concrete channel lining, channel straightening and the elimination of functional floodplain areas (Clearwater Hydrology and Nichols-Berman 2002). The current and evolving regulatory environment affecting flood control activities reflects this changed understanding of flood dynamics and the role of wetlands and riparian areas in regulating floods.

Flooding has historically had severe safety and economic impacts on both urban and rural communities and even parks

The National Flood Insurance Act of 1968 and the Flood Disaster Prevention Act of 1973 established the National Flood Insurance Program (NFIP) which is administered by the Federal Emergency Management Agency (FEMA; Clearwater Hydrology and Nichols Berman 2002). The NFIP provides insurance coverage to property owners within flood hazard areas that are delineated on published Flood Insurance Rate Maps (FIRMs) for both the 100-year and 500-year flood events (Clearwater Hydrology and Nichols-Berman 2002). In order to quality for the program, candidate municipalities and unincorporated county areas must adopt local floodplain development policies and enforce flood control measures for new construction and redevelopment projects within their jurisdictions (Clearwater Hydrology and Nichols-Berman 2002).

FEMA prepares Flood Insurance Studies and associated FIRM maps to assist communities in local land use planning and flood control decision-making (Clearwater Hydrology and Nichols-Berman 2002). The County of Marin entered into the NFIP in 1982, the date the original FIRM maps were published for the incorporated area (Clearwater Hydrology and Nichols-Berman 2002). Based on the CWP, the Project Area falls within the 100-year flood hazard zone (Clearwater Hydrology and Nichols-Berman 2002). The extent of the 500-year flood hazard zone was not delineated in the Point Reyes area (Clearwater Hydrology and Nichols-Berman 2002).

The Park Service specifically addresses flooding in its 2006 Management Policies. Parks are directed to "minimize potentially hazardous conditions associated with flooding" (NPS 2006; Section 4.6.4). Furthermore, parks should "avoid direct and indirect support of floodplain development and actions that could … increase flood risk" (NPS 2006, Section 4.6.4). When development must occur within a floodplain, non-structural measures should be used to reduce hazards to human life and property, while minimizing impacts to the natural resources

of floodplains (NPS 2006; Section 4.6.4). Development must also be consistent with the standards and criteria of the NFIP (NPS 2006; Section 4.6.4).

Background and Regional Flooding Patterns and History

Two forms of flooding occur in Marin County: 1) tidal flooding and 2) watershed flooding (Clearwater Hydrology and Nichols-Berman 2002). Tidal flooding develops when high tides exceed either the top of bank elevation of tidal sloughs and channels, or the crest of bay levees. Watershed flooding occurs in response to severe runoff-inducing rainfall over the tributary watershed of one of the region's stream channels. Major watershed floods are typically generated by rainstorms of 3-4 days duration that include nested periods of high intensity rainfall. Such rainstorms occur primarily during the wet winter season, which normally extends from November through March. When watershed flooding occurs in conjunction with high bay tides in coastal areas of Marin County, the extent and/or depth of overbank flooding or levee overtopping can increase due to an upward adjustment in the flood water surface profile. The potential for tides to affect flooding patterns in coastal areas could increase in the future due to sea level rise, which would increase base elevation ranges for Mean Sea Level (MSL) and Mean Higher High Water (MHHW) and increase the risk of flooding to homes, roads, and other infrastructure that are at or slight above sea level elevations.

Watershed flooding can result from two different and extreme rainfall patterns (Brown 1988). One pattern is a series of regional storms that saturate soils by persistent rainfall over a period of several weeks. The other pattern is a localized storm of high precipitation intensity during which rainfall lasts for a few hours to a few days and may or may not fall on presaturated ground. Both patterns may cause severe flooding. Localized storms often concentrate on the Pacific coastline and release continuous, very intense rains lasting for several hours to a maximum of four days (Brown 1988). As of the mid-1980s, five of the severest localized storms in the San Francisco Bay region occurred in November 1950, October 1962, January-February 1963, January 1967, and January 1982 (Brown 1988). Some of these extreme precipitation events were influenced to some degree by the El Nino climatic phenomenon (Clearwater Hydrology and Nichols-Berman 2002). Typically, the associated weather is much wetter, and storms and tides are more intense than during non- El Nino periods (Clearwater Hydrology and Nichols-Berman 2002).

As rainfall intensity increases, surface run-off from upland areas flows into nearby drainages and creeks. During a storm, waters will continue to rise until they reach a point at which the stage or height of floodwaters in the channel are at their highest, which is called peak flow. From this point, flood flows typically decrease. This flood flow pattern or flood hydrograph often resembles a flood wave that propagates down the creek channel, ultimately dissipating in some larger body of water (Dunne and Leopold 1978). The height or stage of this flood wave depends, in part, on the amount of reservoir capacity within the system (Dunne and Leopold 1978). In addition to man-made water storage structures, "reservoirs" include the channel itself, the "active" floodplain that is subject to flooding during bankfull or ordinary high water flows, and floodplain terraces that include the flood-prone area (~50-year flood events) and more planning-driven concepts such as the 100-year and 500-year floodplains. In low gradient or topographically "flat" systems, floodplain terraces often consist of large flats or plains adjacent to the riparian corridor or, in tidal marsh systems, marsh plains. Floodplains are discussed more under Water Resources – Hydraulics and Hydrologic Processes.

Because of differences in the length of streams, size of watershed, and run-off rates, the peaks of flood waves can be offset somewhat, with peak flooding in adjacent fluvial or creek systems occurring at different times. Differences in peak flow timing and water pressure can sometimes create a phenomenon called backwater flooding in which rising flood flows from a river or creek actually back up into the channel of another connecting creek or tributary, particularly if there is large "reservoir" capacity through extensive floodplains near the tributary's mouth. During very large storm events, floodwaters from the Russian River in Sonoma County actually flow upstream into one of its largest tributaries, the Laguna de Santa Rosa, which has extensive floodplains that are estimated, at times, to provide more floodwater storage than Lake Sonoma and Lake Mendocino combined (City of Sebastopol 2005).

Development of floodplains and even efforts to "control" floods through flood control channels can sometimes exacerbate the degree and damage from flooding. Watershed flooding is commonly associated with the development of formerly active floodplains and an increase in the peak rates of watershed runoff (Clearwater Hydrology and Nichols-Berman 2002). Peak flow rates increase due to increases in impervious surface coverage and the construction of storm drain systems, which reduce the time of concentration for runoff (Clearwater Hydrology and Nichols-Berman 2002). When peak flow rates increase substantially, and the altered flow regime is not accommodated using channel modifications, stormwater detention or diversion,

and/or stream conservation zones, episodic flooding can ensue (Clearwater Hydrology and Nichols-Berman 2002).

Watershed flooding can precipitate other factors that can dramatically increase the risk and damage from flooding such as complete or partial failures of dams and reservoirs. MMWD currently operates five reservoirs in the Lagunitas Creek watershed. Dam failures are extremely rare due to the stringent design and permitting requirements for dam construction and operation (Clearwater Hydrology and Nichols-Berman 2002). However, in the active tectonic environment of the San Francisco Bay Area, the risk of a dam failure during a major earthquake remains a possibility (Clearwater Hydrology and Nichols-Berman 2002).

Damage-inducing flooding has occurred infrequently in the County, primarily in the lower lying alluvial valleys and former marsh plains in eastern Marin that border the San Francisco Bay (Clearwater Hydrology and Nichols-Berman 2002). Because flooding has only been quantified in modern times, comparing the relative degree of flooding between different major flooding events is difficult, particularly as flooding is often evaluated in terms of subjective factors such as number of people affected, property losses, and reports on areal extent of observed inundation (Brown 1988). The most severe winter in terms of precipitation was probably that of 1861-1862 during which regional storms produced massive flooding throughout the San Francisco Bay region (Waananen et al. 1977; Brown 1988). Frequent, major storm-producing precipitation occurred between 1879 and 1915, a period that was followed by 22 years of less damaging or non-damaging precipitation seasons with one exception (Brown 1988). Between 1937 and 1982, damaging storms recurred on average on an interval of once every 3 years, with the 1955 storm considered to be generally the largest of the 20th century (Brown 1988; FEMA 1997). In 1982, much of Marin County was hit by a severe storm whose intensity was increased by a series of high tides.

Project Area Flooding Patterns and History

As the Project Area is situated in an alluvial valley at the confluence of at least three moderate to large-size creeks and a number of smaller drainages, it is perhaps not surprising that the entire Project Area has been mapped within the FEMA-designated 100-year flood hazard zone (Clearwater Hydrology and Nichols-Berman 2002). The history of the Project Area has been one that has marked by a number of catastrophic floods that have caused extensive to homes, ranches, and roads, as well as substantially changed the physical environment. Within the Project Area, flooding is directly influenced by both tidal and watershed processes, with flooding from creeks often exacerbated by extreme tide conditions.

The largest recorded flood in the Project Area and vicinity was the 1982 storm, which is considered to be a rainfall event with a 100-year recurrence interval. Within the San Francisco Bay region in general, the storm dropped as much as half of the mean annual precipitation within a period of about 32 hours, triggering 18,000 slides, damaging 100 homes, and killing 14 people (Ellen et al. 1988). In Olema and Inverness, 24-hour rainfall totaled 11-20 inches. Flood- and tidal waters completely inundated the Project Area and surrounding low-lying lands, including many of the homes along Levee Road and large sections of the road itself. Damage was intensified by numerous catastrophic landslides along the Inverness Ridge, with the resulting debris flow exacerbating flooding by blocking stream channels and drainage ways and causing localized flooding of Sir Francis Drake Boulevard (Ellen et al. 1988). Huge amounts of sediment were excavated from Bear Valley Creek and other drainages. As described under Hydrologic Resources, the flood also had major effects on hydrologic and geomorphic processes of local creeks, including Bear Valley Creek.

North bank of Giacomini Ranch East Pasture levee during 1982 Storm, a 100-Year Flood Event (Photo: Tom Quinn)

The Giacomini Ranch levees were completely submerged in the high water of this flood. Levees failed in several locations, including along the right bank (East Pasture) between the former summer dam and a few

hundred feet downstream of the Green Bridge; opposite the White House Pool County Park; almost the entire length of the West Pasture bordering the creek; and numerous locations along the East Pasture between White House Pool and the North Levee (KHE 2006a). As with many other floods that severely affected coastal areas, damage was exacerbated by the fact that the flood coincided with a series of higher high tides.

Following the flood, the Giacominis successfully petitioned for the Corps to armor the right bank of Lagunitas Creek with rip rap for several hundred feet upstream of the former summer dam. In addition, the Giacominis replaced the former creek-side levee to its current, set-back location by importing 200- to 300 cubic yards of local landslide material (KHE 2006a). The rebuilt section of levee became higher in elevation than lands on the south side of Lagunitas Creek, which effectively increased flooding potential of homes along Levee Road (KHE 2006a). In response to flood damage from the 1982 event, Marin County formed Flood Control Zone 10, which covers the Inverness Ridge, to collect taxes and clean and restore local creek channels (Clearwater Hydrology and Nichols-Berman 2002).

In 1998, another flooding event occurred, which was estimated as having a 10-year recurrence interval. Again, the entire alluvial valley and floodplains of Lagunitas and Olema Creeks were underwater. Residents along Levee Road and the east side of Sir Francis Drake Boulevard reported substantial flooding, although flooding for many homes on Levee Road was reduced by not only the decreased severity of flooding relative to the 1982 storm, but by the fact that many of the homes had been raised to decrease flood frequency.

This storm was also accompanied by some major hydrologic and geomorphic changes in the Project Area, including an apparent shift in the channel course of Bear Valley Creek from the west to the east side of Olema Marsh, possibly in response to excessive sediment deposition on the west side of the marsh from Inverness Ridge erosion. This sediment deposition resulted in blockage of the western culvert near the White House Pool County Park parking lot and redirection of Bear Valley Creek flow and other Olema Marsh waters to the other remaining culvert in the northeastern corner of Olema Marsh (KHE 2006b). Blockage of the western outlet reduced the available surface area for potential flow conveyance from the marsh from 106 square feet to 42 square feet, which translates into a reduction in conveyance capacity from approximately 630 – 700 cfs to 410 cfs (KHE 2006a). A 5-year flood event produces approximately 490 cfs in Bear Valley Creek (G. Kamman, KHE, *pers. comm*.). The reduction in outflow is compounded by two other factors, as well: the eastern culvert is installed at a higher elevation than the western culvert, and a 315-linear-foot earthen berm that is hardened by heavy vegetation establishment near the eastern outlet acts as a funnel, further limiting drainage (KHE 2006b). These hydrologic impediments appear to be causing a steady increase in standing water levels within Olema Marsh, with water levels possibly increasing as much as 6 feet since 1990 (Evans 1990, KHE 2006b). These increasing water levels exacerbate the potential for flooding of Levee Road and Bear Valley Road, which already flood frequently during storms.

On December 30-31, 2005, intense rainfall and extreme high tides again produced another major flooding event in the Project Area and other portions of the San Francisco Bay region. The magnitude of this flood on Lagunitas Creek at the USGS Point Reyes Station gage has been roughly estimated as an approximately 30-year flood (Greg Kamman, KHE, *pers. comm*.). The Giacomini Ranch flooded completely, with flooding exacerbated by damage to the Giacomini Ranch East Pasture levee a short distance downstream of Green Bridge and near the former summer dam site. Residents along Levee Road noted an appreciable drop in creek water levels when the levees breached (J. Langdon, Levee Road resident, *pers. comm*.). Flooding was again compounded by extreme high tides, which backed up residual floodwaters and caused additional flooding in the Project Area and upstream areas on Lagunitas, Olema, and Bear Valley Creeks. Properties and/or homes on Levee Road and the east side of Sir Francis Drake Boulevard flooded, with the latter apparently due to blockage of stream channels from debris flows off the Inverness Ridge.

While major flooding events remain the most memorable in terms of extent of inundation and damage, hydraulic modeling conducted as part of the proposed projects suggests that the Project Area and vicinity floods frequently, even during lesser storm events. Model simulation results indicate that the southern creek bank of Lagunitas Creek on which approximately 15 to 20 Levee Road homes are constructed generally starts to become overtopped by flood flows during storms with a 3-year recurrence interval (KHE 2006a). Based on hydraulic modeling, properties on the eastern portion of Levee Road would not be completely flooded until flows exceed a 5-year storm event, whereas homes on the western portion of Levee Road, White House Pool park, and Levee Road near White House Pool park would be completely flooded during a 5-year or even smaller storm event (Table 20). These areas are flooded despite the fact that water surface elevations generally drop as flood flows move downstream past the western Levee Road homes towards White House Pool, because, at least during higher flood flows, flood pressure is being partially relieved by overtopping of

the Giacomini Ranch levee (Table 20).

TABLE 20. ESTIMATED FREQUENCY OF FLOODING BY LAGUNITAS CREEK UNDER EXISTING CONDITIONS FOR PROPERTIES AND ROADS ADJACENT TO THE PROJECT AREA

Note: Estimates are based on vertical flood elevations generated by computer hydraulic modeling (KHE 2006a) and elevation information from topographic survey performed by the USGS (2003b) and are for flooding by Lagunitas Creek only.

Location	Vertical Flood Elevation**	Extent of Potential Flooding Based on Hydraulic Model (KHE 2006a) and Topography (USGS 2003b).
Levee Road Homes East		
2-Year Event	~ < 12	No potential for flooding from Lagunitas Creek.
5-Year Event	~ <15.3	Flooding. Creekside edges of properties potentially flooded.
10-Year Event	~ <16.9	Flooding. Properties and Levee Road flooded except for southeastern corner of Levee Road near State Route 1.
50 – 500 Year Events	~19.1 – 21.4	Flooding. Potential for properties and roads to be flooded completely.
Levee Road Homes West		
2-Year Event	~11.4 – 11.6	Flooding. Potential for some flooding in northern portion of properties 500 to 1,000 feet east of Olema Creek.
5-Year Event	~ <15.0	Flooding. Potential for properties to be flooded up to Levee Road and for flooding of Levee Road west of Olema Creek.
10 – 500 Year Events	~16.1 – 20.8	Flooding. Potential for properties and Levee Road to be completely flooded.
Levee Road WHP Park		
2-Year Event	~ 10.1 – 11.0	Flooding. Potential for WHP Park to be flooded extensively with minimal flooding of Levee Road.
5- to 500 Year Events	~ 12.9 – 18.1	Flooding. Potential for almost all of park and Levee Road from Olema Creek to Bear Valley Road to be flooded.
WHP at Sir Francis Drake		
2- to 10- Year Events	~9.8 – 13.1	No potential for flooding from Lagunitas Creek.
50 – 500 Year Events	~14.1 – 15.0	Small potential for flooding from Lagunitas Creek during 500-year flood event.
Sir Francis Drake Homes East		
2- to 5-Year Events	~6.25 to 7	No potential for flooding from Lagunitas Creek.
10-Year Event	<7.8	No potential for flooding from Lagunitas Creek. Pasture just east of Gradjanski property flooded.
50-Year Event	<8.8	Flooding. Very eastern edge of Gradjanski property flooded by Lagunitas Creek. No potential for flooding of home.
100-Year Event	<10.1	Flooding. Larger portion of eastern edge of Gradjanski property and eastern edge of Lucchesi/Kostelic properties flooded by Lagunitas Creek. No potential for flooding of homes.
500-Year Event	~ 11.8 – 13.0	Flooding. Eastern half of private properties flooded by Lagunitas Creek. Flooding close (~ 1 foot) to lowest elevation home. Flooding 3- to 4 feet below elevation of other two homes.

Based on hydraulic modeling estimates, flood flows overtop the portion of the Giacomini Ranch East Pasture levee near the old summer dam during 3.5-year storm events or during storms with slightly higher water levels than a 3-year event (KHE 2006a). Upstream of this and near where the levees were repaired after the 1982 flood event, the minimum flood flows capable of overtopping the East Pasture levee increases substantially, with modeling suggesting that 100-year flood events would be required (KHE 2006a). Downstream of White House Pool, the West Pastures levees overtop during flood events with a 12-year recurrence interval or greater while the East Pasture levee is overtopped by a 7-year flood or greater (KHE 2006a).

Water levels in the West Pasture simulated by hydraulic modeling in the West Pasture indicate that the three primary residences on the east side of Sir Francis Drake Boulevard are not impacted by rising waters from Lagunitas Creek during any of the simulated flood events (5-, 10, 50-, 100-year), except for potentially the 500-year storm event (Table 20; KHE 2006a). The eastern edge of the Gradjanski property -- which is already an existing freshwater marsh – probably floods under 50-year flood events in Lagunitas Creek, while

the eastern edge of the Lucchesi and Kostelic residences would flood only during 100-year flood events (Table 20; KHE 2006a). With the exception of the lowest elevation home, all structures would appear to remain 3- to 4-feet above the 500-year flood water level from Lagunitas Creek: the lowest elevation home would be within 1 foot of the 500-year flood water level. These homes and properties are protected from flooding by Lagunitas Creek not by the levees, which are actually much lower in elevation than the homes, but by the fact that they were constructed on alluvial fans created by some of the numerous Inverness Creek drainages that flow into the West Pasture (KHE 2006a). In addition, based on hydraulic modeling simulations, Lagunitas Creek does not appear to create a backwater effect on upper reaches of either Fish Hatchery Creek or the 1906 Drainage that would increase flood risk (KHE 2006a).

The continued flooding of the homes and properties adjacent to Sir Francis Drake Boulevard in Inverness Park that has been documented even under relatively minor storm events is due to these homes' proximity to the Fish Hatchery Creek and 1906 Drainages that flow off the Inverness Ridge (KHE 2006a). During storms, the Inverness Ridge is prone to landsliding due to its weathered granite bedrock composition (KHE 2006a). In addition to large volumes of sediment, these tributaries frequently produce and carry large woody debris (KHE 2006a). Cumulatively, the sediment and debris commonly clogs the culverts passing beneath Sir Francis Drake Boulevard, causing water, sediment and debris to overtop the road and flow towards the houses (KHE 2006a). Material that passes through the culverts or over the road also falls out of suspension on the downhill side of the roadway due to the rapid change in slope and stream energy (KHE 2006a). This material accumulates and fills drainages, causing further overtopping of creek banks and flooding of surrounding areas (KHE 2006a).

Flood hydrographs or patterns for Lagunitas Creek and its tributaries in the Project Area, Olema and Bear Valley Creeks, show that peak flows appear to be offset, such that the peak of the flood wave from Bear Valley Creek arrives at the confluence before that of Olema Creek and Lagunitas Creek. Based on review of available historical flood flow records, the Olema Creek peak is estimated to lag 2 hours behind the Bear Valley peak, while peak flows on Lagunitas Creek lag 6 hours and 4 hours behind the Bear Valley and Olema Creek peaks, respectively (KHE 2006a). However, backwater flooding at the mouth of Bear Valley Creek primarily occurs during 2-year+ flood events not due to backup of waters from Lagunitas Creek, but due to reduced conveyance capacity through the Levee Road culvert connecting Olema Marsh to Lagunitas Creek (KHE 2006a).

TABLE 21. FLOOD DISCHARGE ESTIMATES FOR VARIOUS RETURN INTERVALS

	FEMA (1997) 107.3 mi^2	USGS 81.6 mi^2	KHE[1] 81.6 mi^2	FEMA/NPS 14.6 mi^2	FEMA[3] 15.2 mi^2	KHE 15.2 mi^2
Year/Flood Return Period	Lagunitas Creek at Olema Ck. (107.3 mi^2) (cfs)	Lagunitas Creek at Pt. Reyes (81.6 mi^2) (cfs)	Lagunitas Creek at Pt. Reyes (81.6 mi^2) (cfs)	Olema Creek At Bear Valley Rd. (14.6 mi^2) (cfs)	Olema Creek At Lagunitas Creek (15.2 mi^2) (cfs)	Olema Creek At Lagunitas Creek (15.2 mi^2) (cfs)
Reported Discharge						
1982	n/a	22,100	n/a	n/a	n/a	4,117
1998	n/a	12,200	n/a	2503[2]	2,599	n/a
2005	n/a	17,700	n/a	n/a	n/a	4,117
Predicted Discharge						
2-yr	n/a	n/a	3515	n/a	n/a	1,193
5-yr	n/a	n/a	8,051	n/a	n/a	2,152
10-yr	14,700	n/a	11,597	3,590	3,728	2,815
50-yr	25,000	n/a	19,830	5,150	5,348	4,624
100-yr	28,050	n/a	23,268	5,720	5,939	n/a
500-yr	34,840	n/a	30,799	6,810	7,071	n/a

Notes: 1) Flow estimates from flood frequency analysis (KHE 2006a).
2) From B. Ketcham, Seashore, *pers. comm*. 2003.
3) FEMA 1997 estimates increased by ratio of drainage areas (15.2 mi^2/14.6 mi^2).

Table Source: KHE 2006a

Flood estimates for the 2- through 500-year floods for the Project Area and vicinity are presented in Table 21 (KHE 2006a). A couple of methods were employed to derive these estimates, including: 1) a standard flood frequency analysis of the USGS flow data at their Point Reyes Station gauge (USGS 1982) and 2) applying an area adjustment factor to FEMA unit runoff estimates (FEMA 1997). For comparison, peak flow estimates for the recent 1982, 1998, and 2005 floods are also presented on Table 21. A flood frequency curve generated from the data indicates that the 1998, 1982, and 2005 events approximate floods having a 10-, 100-, and 30-year recurrence interval, respectively.

Disease and Public Health

Background and Regulatory and Policy Setting

Public diseases can be transmitted through a variety of ways, including person-to-person, as well as animal-to-person, contact. Some diseases are transmitted through direct contact such as biting of an insect such as a tick or a mosquito. Others are transmitted indirectly such as transmission of the Hantavirus through respiration or breathing in of air containing virus-laden particulate from fecal matter generated by mice or exposure to air contaminated by birds carrying the avian flu. Some of the most problematic vectors of disease are those that are extremely common, difficult to avoid, and/or difficult to detect such as ticks, mosquitoes, and mice. Each of these vectors shows affinity for particular types of habitats or conditions, although ticks, which are primarily an "upland" problem, can be occasionally found in upland ecotone or high marsh areas bordering marshes that are flooded more infrequently.

Because of mosquitoes' affinity for water, wetlands are typically considered breeding grounds for these insects, although any land that has stagnant or standing water such as old tires, septic systems, abandoned pools, clogged roof gutters, and rice fields or other agricultural operations poses a risk for supporting mosquitoes. Mosquitoes are dipteran insects with aquatic immature stages and an aerial adult stage (Kwasny et al. 2004). Depending upon seasonal and environmental factors, it generally takes three to 12 days for a mosquito to complete its life cycle from developed egg to early adult stage (Kwasny et al. 2004). Mosquitoes are sometimes separated into two groups: floodwater mosquitoes and standing water mosquitoes (Kwasny et al. 2004). Floodwater mosquitoes have eggs that can withstand dry summer conditions in soil, leaf litter, or at the bases of plants until seasonal summer or fall flooding triggers eggs to hatch, pupate, and emerge as adults (Kwasny et al. 2004). This type of mosquito commonly occurs in managed seasonal wetlands such as those in San Francisco Bay and the Central Valley (Kwasny et al. 2004). Standing water mosquitoes lay their eggs in water or on emergent vegetation in water (Kwasny et al. 2004).

Both floodwater and standing water mosquitoes require water for some portion of their life cycle. Typically, mosquitoes need stagnant, still, or "standing" water that is not subject to high flow velocities or dynamic circulation patterns such as strong wind fetch or daily tidal flushing to breed and complete their growth cycle. Wave action across larger bodies of water physically retards mosquito production by inhibiting egg laying and decreasing larval survival (Jones & Stokes Associates 1995). In addition to water residence time, success of mosquitoes' breeding efforts is affected by water quality such that higher temperatures and higher organic content tend to produce greater number of mosquitoes (Collins and Resh 1989). Also, the pattern of flooding may affect mosquito numbers, with gradual increases or decreases in water levels more conducive to breeding than stable or rapidly fluctuating water levels (Jones & Stokes Associates 1995). Many mosquito species attach their eggs to emergent vegetation, which increases the attractiveness of stagnant waters with some emergent vegetation cover such as drainage ditches in diked areas. Emergent vegetation also decreases the ability of natural predators to prey upon mosquitoes.

Mosquitoes affect public health not only by causing localized allergic reactions on skin when mosquitoes bite people, but through transmitting diseases to humans and other birds and mammals. One of the first diseases linked to mosquitoes was malaria, an ancient disease that originated in Africa and that has killed millions during the past couple of centuries (AMCA 2005). Malaria incidences decreased in the mid 20th century when use of pesticides began to control populations of the genus responsible for transmission of the disease, Anopheles (AMCA 2005). Other diseases associated with mosquitoes are dog heartworm, encephalitis, yellow fever, and, most recently, West Nile Virus.

West Nile Virus is an "arbovirus" or arthropod-borne virus that is primarily transmitted by mosquitoes. Its reservoir host is birds, which means that birds can carry the virus and transmit to mosquitoes that bite them unlike people, horses, and most other mammals that act only as incidental or "dead-end" hosts (CDC 2004).

Unlike malaria and dengue fever, which are carried by only one type or genus of mosquito, several genera – a total of 44 species -- can carry West Nile. These mosquitoes bite birds carrying the virus and then transmit it to humans and other animals such as horses. As with many diseases, the virus causes either no symptoms or a mild illness with flu-like symptoms in most individuals, but, in relatively rare cases, particularly with immuno-compromised individuals and the elderly, West Nile can progress to encephalitis, inflammation of the brain, or neurodegenerative disease. The virus was first detected in the United States in 1999 in New York City (DHS 2006a). Since then, it has spread to 44 states, including California, where it was first identified in 2002 (DHS 2006). In 2005, West Nile Virus activity in birds was found in 54 of California's 58 counties (DHS 2006a). As of the end of 2005, 927 human infections from 40 counties had been reported to date, and there were 18 fatalities in California, all of which were in the Central Valley or southern California (DHS 2006a). In Marin County, there have been no reported human cases, although 14 dead birds have tested positive for the virus (DHS 2006a).

Mosquitoes, as well as birds, can also be tested for the virus. DHS presented detailed data for Alameda and Contra Costa counties in east San Francisco Bay. Within these counties, five species of *Culex* mosquitoes tested positive for West Nile in 2005, two of which appeared to have the highest rates of being infected: southern house mosquito (*Culex quinquefasciatus*) and the Western encephalitis mosquito (*Culex tarsalis*), the latter of which is also the carrier for Western Equine Encephalitis. None of the mosquitoes tested to date in Marin County have tested positive for West Nile, but the county has seven mosquito species present that have tested positive elsewhere in California or the United States, including mosquitoes in the genera *Culex*, *Ochlerotatus*, and *Anopheles* (District, unpub. data). The two species that appear to pose the highest threats based on rates of infection are the northern house mosquito (*Culex pipiens*) and potentially the Western encephalitis mosquito (Marin and Sonoma County Mosquito and Vector Control District 2005). Marin has grouped the northern house mosquito with the southern house mosquito (District, unpub. data), probably because they represent subspecies that occur in different climatic regions, but which can hybridize where they occur together.

The rates of infection within particular mosquito species does not directly correspond to rates of disease transmission, because certain mosquitoes have higher affinities for biting humans than others or do not migrate far from larval habitat. *Culex pipiens* is the most common pest species in urban and suburban setting and, therefore, according to the District, represents the most immediate threat to humans in towns and cities of Marin and Sonoma Counties. This species typically bites birds, but certain urban "strains" appear to prefer mammals, including humans (Savage and Miller 1995). *Culex tarsalis* (the "encephalitis mosquito") may be another important local vector. *Culex tarsalis* primarily bites birds, but will bite humans, livestock, and other mammals if the opportunity presents itself (Kwasny et al. 2004). This switching of host species, combined with the ability of this species to travel long distances, makes it a potent vector of arboviruses, and laboratory data suggests that this species may become the primary vector of West Nile in California (Kwasny et al. 2004).

California law requires that, if a problem source of mosquito production exists in waters or lands that have been artificially altered from natural conditions, the party responsible for those conditions is liable for the cost of abatement (California Heath and Safety Code 2000 *et seq*.). Enforcement of this law is the responsibility of local mosquito abatement districts, which are the governmental organizations responsible for controlling specific disease vectors within their jurisdiction. As their name implies, mosquito abatement districts are primarily responsible for controlling mosquitoes as pest species and disease vectors.

Because of concerns regarding West Nile, the western portion of Marin County was annexed into the District in 2005. Through annexation, which required 50 percent approval from West Marin residents, the district expanded its jurisdiction to add 42,000 parcels, 7,000 of which were in Marin County. The annexation drew strong protests from some members of the West Marin community over fears that the District would use chemical pesticides for mosquito control. Specifically, concerns were expressed about use of methoprenes and pyrethins, both of which have been linked in the literature to toxicity in aquatic organisms, including salmon and frogs. Community representatives have been working with the District to test non-toxic approaches to mosquito control that include education and limited use of larvicides that kill mosquitoes during the larvae stage of development. These larvicides contain a naturally occurring bacterium (*Bacillus thuringiensis israelensis*) that is common in soils. A one-year Memorandum of Understanding (MOU) with community groups signed by the District in 2006 limits pesticide use to these larvicides except during public health emergencies (District, unpub. data).

Jurisdiction of mosquito abatement districts extends over private, county, and state lands, but not federal

lands. Federal agencies are responsible for vector control on federal lands. Based on Park Service Management Policies (2006), native organisms such as mosquitoes that are often by perceived by the public as "pests" are viewed as natural elements of the ecosystem and are allowed to function unimpeded, except under certain conditions. One of these conditions under which native organisms are controlled or managed includes when they pose a human health hazard as determined by agencies such as the U.S. Public Health Service (Centers for Disease Control or the Park Service public health programs; NPS 2006, Section 4.4.5.1). The Park Service uses an Integrated Pest Management Program to reduce the risk to the public, park resources, and the environment from pests and pest-related management strategies (NPS 2006, Section 4.4.5.2). Normally, source reduction--eliminating or altering the water so that the mosquitoes cannot breed or complete their life cycle--is the first choice for control (NPS, IPM Manual). If source reduction is impossible or incomplete, the next tactic to consider should be biological control of the larvae with predators, bacterial insecticides, or growth regulators, which would be administered by Park Service staff (NPS, IPM Manual). While the District does not have jurisdiction over the GGNRA and Seashore lands, the parks allowed the District to trap mosquitoes on Park Service lands for identification purposes in 2005.

Mosquito Species and Habitats in the Project Area and Vicinity

Three days of mosquito trapping in June 2005 in the Project Area and other parts of the Seashore found eight species of mosquitoes, and six of these either also or exclusively occurred on the Giacomini Ranch (District, unpub. data). Mosquitoes on the Giacomini Ranch included the Western encephalitis mosquito, tule mosquito (*Culex erythrothorax*), banded foul water mosquito (*Culex stigmatosoma), Culiseta particeps, Culiseta inornata, and Ochlerotatus dorsalis* (District, unpub. data). Based on this limited sample size, the most common species appeared to be the Western encephalitis mosquito, tule mosquito, *Culiseta particeps, and Culiseta inornata*. At least one occurrence of the northern house mosquito was documented in the Olema Valley, but not on the Giacomini Ranch (District, unpub. data). However, results of the sampling could be skewed by the season chosen for sampling (early summer), with certain species potentially not active, or not as active, during this time of year. Park Service staff observations point to mid- to late summer, particularly August, as the peak periods of mosquito abundance.

Of the mosquito species identified on the Giacomini Ranch, three of these have tested positive in California for West Nile: the Western encephalitis mosquito, tule mosquito, and banded foul water mosquito (District, unpub. data). As noted earlier, the Western encephalitis and northern house mosquitoes have been identified by the District as posing the highest risk of West Nile Virus transmission. The Western encephalitis mosquito is a standing water species that lay its eggs in water, and adults can emerge continuously throughout the summer and fall in areas that have been flooded for an extended period of time, usually for more than 2- to 3 weeks. These seasonally to semipermanently flooded areas include rice fields, poorly drained pastures, semi-permanent and permanently flooded wetlands, sewer treatment plants, and dairy farms (Kwasny et al. 2004). The tule mosquito is another standing water mosquito that deposits its eggs among thick vegetation on the edges or margins of lakes and inland ponds and is one of the few mosquitoes that feeds actively during the day (Kwasny et al. 2004). The banded foul water mosquito is so named because of its association with polluted waters: it typically lives for two to three weeks, but females can live up to several months in cooler climates (Napa County Mosquito Abatement District 2004).

On the Giacomini Ranch, District trapping efforts focused on those areas that are seasonally wet for long periods of year (District, unpub. data). As described under Vegetation Resources, the Giacomini Ranch has remained largely wetland despite being diked more than 60 years ago. Flooding from creeks, run-off, groundwater, and, to a certain degree, tides, creates areas with a wide range in the amount of inundation or saturation, lasting from just a few days to throughout the year. Most of these areas are extensively vegetated, with the exception of irrigation drainage ditches and ditched sloughs that have been dredged to remove vegetation. While levees were obviously constructed to exclude flooding from Lagunitas Creek and Tomasini Creek into the pastures, based on hydrologic modeling, they also act to impound waters within the pastures, particularly in the northern portion of the pastures, thereby prolonging the duration of inundation and saturation (KHE, unpub. data). Construction of extensive ditch systems to drain pastures and/or convey irrigation waters also creates stagnant standing water areas that often become vegetated, if not consistently dredged. While currently allowing muted tidal flow due to modifications or malfunctioning, one-way tidegates installed on Fish Hatchery and Tomasini Creeks do not allow waters within these creeks to fully drain during low tides, which creates stagnant or backwater conditions. The overall numbers and seasonal patterns in abundance of mosquitoes have also probably been affected by seasonal irrigation within the East Pasture. Most of the southern portion of the East Pasture is flood irrigated for several months during the summer, often create standing water for several weeks, while fields in the northern portion are typically spray-irrigated.

Near the dairy facility, the Giacominis also maintain several waste ponds, where mosquitoes have apparently been documented in the past.

While no quantitative sampling has been performed, based on Park Service staff observations, mosquito numbers typically appear to be much lower in the undiked marsh than in the northern portion of the West Pasture, although mosquitoes are still present. Because many of the species typically rest during the day, only biting when disturbed or when hosts are present nearby, this suggests that most of the mosquitoes encountered in the undiked marsh are residents, although some may fly over from nearby diked areas..

Fish surveys on the Giacomini Ranch have documented non-native mosquitofish in both the East and West Pasture creeks, drainage ditches, and ditched sloughs (NPS, unpub. data). The Giacominis most likely introduced these species at some point to control mosquito populations. This fish species has been observed only in very low numbers in the immediate vicinity outside the Ranch (NPS, unpub. data). Mosquitofish are considered to be relatively tolerant of the harsh aquatic conditions that exist in some of the Project Area's waters. Many of the drainage ditches and ditched sloughs have very low to no oxygen, even during the day, and high levels of nutrients and pathogen indicators such as fecal coliform (see Water Resources – Water Quality). These hypoxic and even anoxic conditions create poor habitat for other types of native mosquito predators such as native fish and other insects that might help control mosquito populations.

Limited mosquito trapping has been conducted at or near Olema Marsh (District, unpub. data). The most recent sampling in October 2005 found five species of mosquitoes, with the tule mosquito (*Culex erythrothorax*) by far the most prevalent (District, unpub. data). Other species observed included the banded foul water mosquito (*Culex stigmatosoma*), northern house mosquito (*Culex pipiens), Culiseta particeps, and Culiseta inornata* – many of the same species that occur at the Giacomini Ranch (District, unpub. data). Again, at least three of these species – northern house mosquito, tule mosquito, and banded foul water mosquito – are ones that have tested positive for West Nile Virus in California. The water drainage problems in Olema Marsh that have resulted in longer water residence times and stagnant water conditions increase the potential for mosquito breeding within this large freshwater marsh habitat.

Public Services

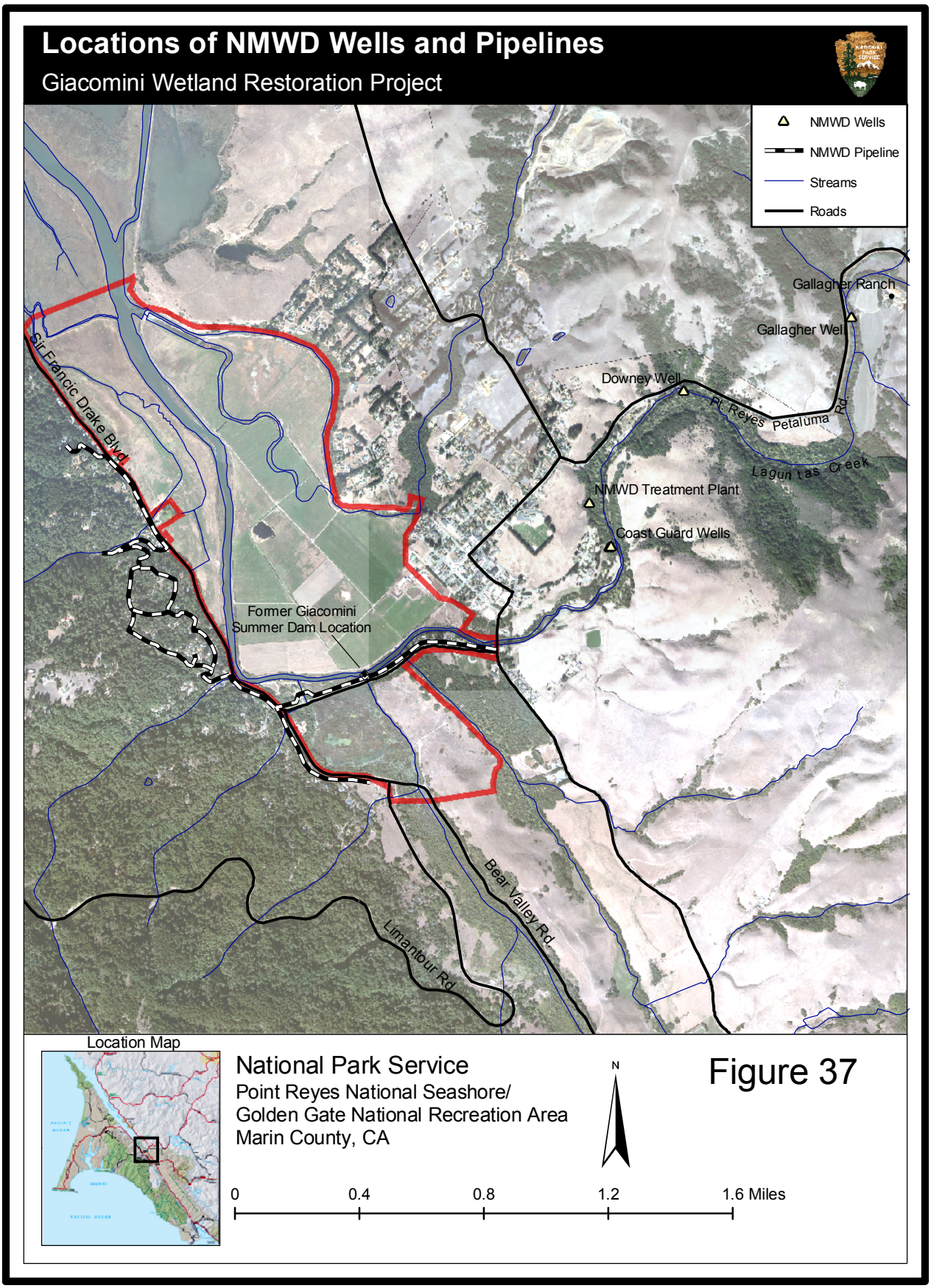
Municipal Water Supply

Regional and Project Area Setting

Marin County is served by five water districts. These water districts obtain water supplies from local surface water reservoirs, groundwater, and through agreements for imported water with out-of-county agencies such as the Sonoma County Water Agency. The districts are responsible for providing water to residents and seeking new sources of water when projections indicate a potential long-term deficit in supply. The Project Area is located within the North Marin Water District (NMWD) West Marin Service Territory. NMWD also services Novato in eastern Marin County, however, there is no direct connection of water supply between the two service territories. Freshwater flow on Lagunitas Creek, which flows through the Project Area, is largely controlled, however, by five dams operated by the Marin Municipal Water District (MMWD), which services most of the rest of eastern Marin County. Water supply for the community of Inverness, northwest of the Project Area, is provided by a smaller district, the Inverness Public Utilities District.

Within the West Marin area, NMWD services the towns of Point Reyes Station, Olema, Bear Valley, Inverness Park, and Paradise Ranch Estates. NMWD has 775 active accounts in the West Marin service area, which equates to about 1,769 people using NMWD's estimate of 2.28 people per account (D. McIntyre, NMWD, *pers. comm*.). Currently, the West Marin service area water demand totals approximately 316 acre-feet per year (afy). The projected future demand is 480 afy. NMWD is currently working on a long-range water system plan to identify required facility replacement and improvements needed to properly serve existing and future customers in the West Marin service areas.

NMWD currently obtains its water supply for the West Marin service area from two wells located adjacent to Lagunitas Creek on the U.S. Coast Guard (USCG) property in Point Reyes Station (Figure 37). These wells were installed in 1970. Prior to installation of the wells, NMWD had conducted a study of potential groundwater sources for a potential development project on the east shore of Tomales Bay and concluded that


Locations of NMWD Wells and Pipelines
Giacomini Wetland Restoration Project
NMWD Wells
NMWD Pipeline
Streams
Roads
Gallagher Ranch
Gallagher Well
Downey Well
Pt Reyes Petaluma Rd
Lagunitas Creek
NMWD Treatment Plant
Coast Guard Wells
Sir Francis Drake Blvd
Former Giacomini
Summer Dam Location
Bear Valley Rd.
Limantour Rd
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.4
0.8
1.2
1.6 Miles
Figure 37

the only aquifers capable of yielding significant amounts of water were in alluvial deposits along stream channels (NMWD 1967).

The Coast Guard wells are located approximately 50-feet from the edge of Lagunitas Creek with perforations starting 5-feet below the surface of the creek (SWRCB 1995). The wells are 60-feet deep and extend to bedrock, which is located about 50 feet below the surface of the stream (SWRCB 1995). Recent investigations into stratigraphy of this general area associated with Point Reyes Affordable Housing Project show that soils consist of alluvial deposits (fluvial or creek material), terrace deposits (marine material), and bedrock, which is shale, sandstone, and claystone and believed to be part of the Millerton Formation (Questa Engineering Corp. 2000). The alluvial deposits generally consist of gravelly loams at the surface with interbedded layers of gravelly sands and clays of varying thickness and density (Questa Engineering Corp. 2000). The wells are located in alluvial deposits of unconsolidated sand, silt, and gravel at the lower end of Lagunitas Creek, with the depth of alluvium restricted by the depth to bedrock (SWRCB 1995). A NMWD description of soils encountered during construction of the well indicates the upper 15-feet of alluvial deposits at the Coast Guard wells consist of brown sandy loam (KHE 2006a). Blue sandy clay occurred between 15- and 30-feet below ground surface (bgs), followed by blue sandy clay with some gravel from 30- to 35-feet bgs (KHE 2006a). Five feet of "washed" gravel was encountered from 40- to 50-feet bgs, followed by 10-feet (50- to 60-feet bgs) of brown cemented gravel and clay (KHE 2006a). Bedrock occurred below 60-feet (KHE 2006a).

Capacity of the Coast Guard wells is approximately 807 to 968 afy, which equals approximately 500 to 600 gallons per minute (gpm). The water is pumped from the wells to the Point Reyes Water Treatment Plant, where it is treated before being piped to end users. Treatment typically involves removal of iron and manganese using potassium permanganate and green sand filtration, followed by disinfection with chlorine. Once treated, the water can be stored before it is distributed. The Point Reyes area has three water storage tanks with a total storage capacity of 500,000 gallons. From this facility, water is distributed to Olema, Bear Valley, and Inverness Park in the West Marin Service area: distribution pipelines are discussed further below.

NMWD has two other active wells that it has developed –the Downey Well and the Gallagher Well. The Downey and Gallagher wells are located at varying distances upstream of the Coast Guard wells on Lagunitas Creek (Figure 37). The Downey Well is no longer used for municipal water supply. NMWD, however, is currently contracted with the Giacominis to provide 1.23 cfs from this well during the summer to the Giacomini Ranch for irrigation purposes, although water deliveries typically average closer to 1 cfs (C. DeGabriele, NMWD, *pers. comm*.). This contract is set to expire in July 2008 (C. DeGabriele, NMWD, *pers. comm*.). The Gallagher Ranch well is used for emergency purposes and is not currently connected to the West Marin distribution system, although NMWD is contemplating further development of this well in the future to meet existing demand and offset seasonal quality problems with the Coast Guard wells.

Regulatory and Policy Setting

Federal and state regulations and policies protect both the supply and quality of drinking water for the public. The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, which include rivers, lakes, reservoirs, springs, and ground water wells. SDWA authorizes the USEPA to set national health-based primary standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. Within California, the authority for implementation of the SDWA has been delegated to the California Department of Health Services (DHS). The California Safe Drinking Water Act (CA SDWA) was passed to build on and strengthen the federal SDWA. The CA SDWA authorizes DHS to protect the public from contaminants in drinking water by establishing maximum contaminants levels (MCLs) that are at least as stringent as those developed by the U.S. EPA, as required by the federal SDWA. Some of the more recently established primary standards set by DHS include limits on disinfection by-products such as chlorites, which was established in June 2006: USEPA established standards for this pollutant for systems serving more than 10,000 people in 2004. In addition to primary standards, DHS has also set secondary drinking water standards and MCLs for analytes or contaminants of lesser concern that affect the taste, odor, or appearance of drinking water such as chlorides.

Protection of drinking water supplies also occurs through the Porter-Cologne Act. Water quality control plans designate beneficial uses of water for specific water bodies, establish water quality objectives to protect those uses, and provide a program to implement the objectives: one of those beneficial uses is municipal and domestic water supply. For Lagunitas Creek, SWRCB has designated municipal and domestic water supply as

a beneficial use, as well as contact and non-contact recreation, agricultural supply, cold freshwater habitat, fish migration, preservation of rare and endangered species, recreation, fish, spawning, and wildlife habitat. A more complete description of this law can be found under Water Resources – Water Quality. Marin County also regulates activities that substantially degrade or deplete groundwater resources, interfere with groundwater recharge, or substantially degrade surface or groundwater quality through CEQA review.

Municipal Water Supply Issues – Water Distribution

NMWD supplies water to its customers using a network of pipelines, which are either buried belowground or suspended below bridges. There are no water collection, treatment, or storage facilities within the Project Area, but some of distribution pipeline systems are present. Approximately 185,000 gallons of water is piped via an 8-inch asbestos cement, steel, PVC, or iron pipeline system to Levee Road, Inverness Park, and Bear Valley service areas through a pipeline that runs from Point Reyes Station on the north side of State Route 1 and Levee Road to the Sir Francis Drake Boulevard/Bear Valley Road intersection. The pipeline is suspended underneath the Green Bridge and the Olema Creek Bridge on Levee Road, but is buried below ground at both the current eastern outlet and former western outlet of Bear Valley Creek near Olema Marsh (NMWD, unpub. data). The pipeline is buried directly adjacent to the road at the current eastern outlet of Bear Valley Creek, but, at the former western outlet (and current outlet for the Silver Hills drainage), the pipeline route has been diverted slightly such that the pipe is located approximately 100 feet from Levee Road. The current depth of the underground pipeline along Levee Road is unknown, particularly in creek areas where there is potential for changes in surface grade elevations due to sedimentation or erosion, but most buried pipelines are installed so that the top of the pipe is approximately 3 feet below existing grade (C. Chandrasekera, NMWD, *pers. comm*.). From the intersection with Bear Valley Road, a 6-inch pipeline runs to Inverness Park along the western side of Sir Francis Drake Boulevard in Inverness Park (NMWD, unpub. data). Another pipeline runs on the western side of Bear Valley Road to Fox Drive with connections to other pipelines servicing the Silver Hills community and the Bear Valley storage tanks (NMWD, unpub. data). The Bear Valley Road pipeline does not cross Bear Valley Creek.

Municipal Water Supply Issues – Salinity Intrusion

In 1976, NMWD started having problems with salinity intrusion into the Coast Guard wells. Water districts are required by law to provide safe drinking water for customers. The 1995 Basin Plan (RWQCB 1995a) specifies that "controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat." In addition, California DHS sets chloride levels in potable water as a secondary drinking water standard (NMWD 1997) and recently established disinfection by-products such as chlorites as a primary drinking water standard in 2006. Chlorides can combine with the sodium hypochlorite used for disinfection to create disinfection by-products (C. DeGabriele, NMWD, pers. comm.).

Chloride is a conservative ion, meaning that it does not change forms or bind readily to soils, and is therefore considered a good indicator of water salinity. Chlorides occur in waters derived from both marine and terrestrial sources such as surface waters (fluvial or creek, run-off, etc.) and groundwater, with mineral content of terrestrial sources determined by weathering of rocks native to the area. Primarily for aesthetic reasons, DHS has set the recommended maximum contaminant level (MCL) for chloride at 250 mg/L (NMWD 1997). The upper MCL is 500 mg/L (NMWD 1997). A chloride concentration of 250 mg/L is considered the taste threshold for most people, however, often people can taste levels as low as 100 mg/L (NMWD 1997). Elevated salinities can also create problems with primary drinking water standards through creation of disinfection by-products. The MCL for chlorites is 1.0 mg/L. In addition to these concerns, elevated chlorides can negatively affect people with sodium issues and are often accompanied by increases in manganese that result in discoloration of treated water effluent (NMWD 1997). NMWD has established 100 mg/L as its threshold (NMWD 1997).

Salinity intrusion is a common concern for water districts located in coastal watersheds that rely on groundwater for supplies. Typically, this type of salinity intrusion problem results from overpumping of "fresh" aquifers for municipal and agricultural water supplies, which allows intrusion of underlying marine-dominated saline "groundwater" from bays or oceans to move landward. Based on groundwater gradient data collected to date, there is no evidence that this phenomenon is occurring in the Lagunitas Creek watershed (Questa Engineering Corp. 2001). Despite considerable study, the exact cause of salinity intrusion in the Coast Guard Wells is still uncertain, but mechanisms governing salinity intrusion are likely to be complex and involve a combination of many factors. Starting in the early 1990s, when the Park Service began discussions with the

Giacominis regarding purchase of the Giacomini Ranch, a number of studies have been conducted to evaluate salinity intrusion dynamics at the Coast Guard wells, including studies by Philip Williams and Associates (1996a; 1996b), NMWD and Soldati Engineering (NMWD 1997), and Kamman Hydrology & Engineering, Inc. (KHE 2006a) as part of baseline studies for the proposed project.

Salinity intrusion into the Coast Guard wells first occurred in 1976-1977 coinciding with an extreme two-year drought event (NMWD 1997). In the 1970s, the Giacomini family was still installing the gravel summer dam each summer downstream on Lagunitas Creek for the purposes of drawing irrigation water to increase pasture forage (See Water Resources for more detailed description). The summer dam was located approximately 2,500 feet downstream of the Green Bridge and 5,700 feet downstream of the Coast Guard wells (NMWD 1997). In addition to providing irrigation waters for Giacomini, the summer dam had the additional benefit of being "an effective barrier to prevent saltwater from flowing upstream in the groundwater basin during high tide cycles and contaminating the District's Coast Guard wells" (NMWD 1997). The dam created a pond that was about 7-feet deep and extended about 1.75-miles upstream, inundating approximately 17-acres (SWRCB 1995). Giacomini typically installed the dam in May or June, with removal occurring in November or December, often by large creek flows associated with rainfall events (NMWD 1997).

In 1976, when the gravel dam was removed on January 18, 1976, chloride levels within the wells rose from 29 mg/L to 106 mg/L in 10 days, peaking at 230 mg/L on February 10, and did not dip below 100 mg/L until March 1977 (NMWD 1997). Creek flow had been below 4 cfs for several months and, during the month of January, consistently fell below 3 cfs, dropping as low 1.6 cfs during this period (USGS Point Reyes gage). The day following removal of the dam, predicted tides at Inverness peaked at 6. 1 feet MLLW, with salinity intrusion occurring approximately 8 days after the last high tide exceeding 5.5 feet MLLW. The following winter, the dam was removed on January 4, 1977, and chlorides within the well rose to 198 mg/L, approximately 10 days after the end of the last higher high tide series. From 1976 through 1997, salinity intrusion events as determined by chloride levels exceeding 100 mg/L occurred in six separate events: January-February 1976, January - May 1977, December 1977, December 1980-January 1981, January-February 1981, and December 1986 (NMWD 1997). Based on monthly and weekly data collected by NMWD, well chloride concentrations remained far below 100 mg/L between 1987 and 1997 (NMWD, unpub. data *in* KHE 2006a).

Based on qualitative analysis of the data, NMWD was not able to find a strong correlation between high tides and salinity intrusion events, perhaps because of the "noise" generated by so many other factors such as pumping rates, dam operation, etc. However, through an analysis of patterns in the data, NMWD concluded that, during this period, salinity intrusion events appeared to occur when several factors coincided, specifically 1) the dam was down, 2) Lagunitas Creek flows were lower than 5 cfs for several weeks, and 3) tides as predicted for Inverness exceeded 6.4 ft MLLW (NMWD 1997). Other findings included that infrequent high chloride levels recorded in the creek typically occurred one to two weeks before elevated chlorides were detected in the well and that, once salinity intrusion occurred, chloride levels would remain elevated (>100 mg/L) from three weeks to as long as 16 weeks (NMWD 1997). Earlier, PWA concluded that the Coast Guard wells could operate without saltwater affecting the wells for flows above 6 cfs, although the occasional spring tide would push the salinity front upstream above the wells at high tide (PWA 1996b). PWA also noted the "considerable time lag" of one week between occurrence of high chlorides in the creek and high chlorides in the well (PWA 1996b).

Between 1970 and 1997, when the summer dam was installed annually, salinity intrusion appeared to only occur in the winter or season of higher high tides -- typically December through February with tides exceeding 6.0 feet MLLW -- when the dam was down, but streamflows were low (<5-6 cfs), either because the rainy season had not started yet or because of drought (1976-1977). The one salinity intrusion that occurred when the dam was installed took place during the drought when the dam was put in after the winter high tide series, thereby probably trapping saline waters that could be diluted by the minimal streamflow present (NMWD 1997).

In the 1990s, several events occurred that caused NMWD to become concerned about the long-term future of the Coast Guard wells in terms of providing potable water to West Marin customers. The State Water Resources Control Board (SWRCB) was reevaluating the advisability of continuing to issue permits to the Giacominis for annual installation of the gravel summer dam at its historic location upstream of White House Pool because of concerns regarding impacts to beneficial uses within Lagunitas Creek such as water quality and support of wildlife, particularly to coho salmon and steelhead. In 1995, the SWRCB issued a decision to not issue the Giacominis a permit for installation of the gravel summer dam at that location, effective in 1997, although it did not prohibit location of a dam upstream of Highway 1 bridge during a specified period. The

SWRCB also mandated minimum in-stream flow requirements of 8 cfs during average- and wet-year summers and 6 cfs during dry-year summers as measured at the Samuel P. Taylor USGS gage, with instream flow requirements rising to 20 cfs required in November.

Concurrently, the Park Service began actively discussing with the Giacomini family purchase of 550 acres of the Giacomini Ranch for wetlands restoration. Specifically, NMWD was worried that wetland restoration through removal of levees would move the saltwater-freshwater interface upstream closer to the wells (NMWD 1997). While the feasibility study conducted in 1993 only fleetingly referred to the salinity intrusion issue (PWA et al. 1993), the Park Service subsequently contracted with PWA to evaluate in greater detail the potential for the restoration project to increase salinity intrusion into the Coast Guard wells. A number of technical memoranda were prepared in April and May 1996 (PWA 1996a, 1996b).

Concerned about the loss of the gravel dam and the potential for the ranch to be restored to tidal wetlands, NMWD contracted with Soldati Engineering to analyze all of the water quality and other data collected to date to assess the potential for future salinity intrusion events and identify ways to provide adequate, good quality water to the West Marin area given the coming changes. The NMWD study (1997) recommended several potential mitigation measures, including further development of the Gallagher Well and construction of a connecting pipeline. In addition, NMWD started performing off-tide pumping. Under this practice, NMWD stops pumping for a six hour period (three hours before to three hours after) peak tides, when the predicted tide at Inverness is greater than 5.9 feet. Based on NMWD data, with implementation of the off-tide pumping practices, there have been a few periods since 1997 in which the salinity intrusion threshold of 100 mg/L either came very close to being exceeded (>90 mg/L; August 2001, October 2002 June 2003) or was exceeded (>100 mg/L; November – January 2003; July – September 2004; NMWD, unpub. data). There were no salinity intrusion events in 2005.

As part of the Point Reyes Affordable Housing Project, Questa Engineering Corp. performed a hydrogeologic investigation for the area located west of the USCG property in the town of Point Reyes Station on Mesa Road (Questa Engineering Corp. 2000). Because of concerns related to the impact of proposed leach fields on the Coast Guard wells and municipal water supply, Questa (2000) performed a detailed groundwater investigation and analysis. Questa (2000) determined that the housing project largely occurred outside the Zone of Contribution or recharge area to the Coast Guard wells. Groundwater gradients generally followed topographic gradient with waters flowing from the coastal marine terrace uplands into the adjacent Lagunitas Creek aquifer in which the Coast Guard wells are constructed (Questa Engineering Corp. 2000). However, while groundwater generally followed topographic gradients, to the east and southeast of the housing project, "there is a distinct turning of the groundwater contours towards the east that reflects the draw-down influence of the NMWD water wells" (Questa Engineering Corp. 2000). Questa (2000) concluded that the area where this shift in groundwater gradient direction occurred represented the apparent Zone of Contribution or recharge area for the Coast Guard wells, which appears to be oriented along the axis of Lagunitas Creek (Questa Engineering Corp. 2001). Questa noted in its report that, while the Coast Guard wells are "recharged largely by the streamflow/underflow of Lagunitas Creek," lateral inflow from the adjacent hills appears to play a role, as well, although probably "to a lesser degree."

As part of its investigation, Questa collected water samples from monitoring wells for analysis in December 1999, January 2000, and March 2000. Despite the fact that it was winter, chloride concentrations in groundwater sampled during this period still ranged from 48 to 138 mg/L, compared to 18 to 35 mg/L for well and creek water samples collected by NMWD during all of 1999 (Questa Engineering Corp. 2000). Water quality testing results indicate that elevated late-season chloride concentrations in groundwater are reduced significantly through the winter wet season, likely due to increased surface water recharge (KHE 2006a). In its response to comments on the draft EIR, Questa postulated that "tidal effects in Lagunitas Creek in the vicinity of the NMWD wells are more likely to have a stabilizing influence on groundwater levels during drought conditions" by maintaining the existing groundwater gradient and, thereby, the existing groundwater travel time from the eastern boundary of the housing project to the wells, estimated to be on the order of 2 to 3 years (Questa Engineering Corp. 2001).

As part of hydrologic analyses and modeling contracted for under the proposed project, KHE evaluated prior research into salinity intrusion events, as well as data collected by both NMWD and the Seashore. NMWD data included discrete water quality data (weekly and quarterly samples that include chloride and other ions), pumping rates, stream flow, predicted tides at Inverness, well completion reports, and miscellaneous correspondence (KHE 2006a). The Seashore and KHE also collected additional topographic information upstream of the Green Bridge to improve hydrodynamic model calibration, discrete water samples and salinity sampling during high tides, and continuous water level and salinity data for portions of September and

October 2005. NMWD also collected additional discrete sample data during a high tide series in October 2005. Representatives from KHE and the Seashore met with NMWD representatives several times to coordinate monitoring efforts and discuss available data and preliminary findings. One of the factors that improved data analysis capabilities relative to the 1997 efforts was the availability of continuous water quality data (continuous quasi-conductivity data), which is collected at the treatment plant by NMWD. This data provided a finer level of detail on fluctuations in salinity at the treatment plant in relation to stream discharge, pumping, and tides. Both monitoring and modeling investigations focused on the reach or section of Lagunitas Creek adjacent to the NMWD Coast Guard wells, which previous studies had pointed to as the area where infiltration was probably occurring.

Continuous and discrete monitoring data collected by KHE and the Seashore during the low-flow period in September-October 2005 indicate that tidally-driven water level changes occur in Lagunitas Creek adjacent to the Coast Guard wells when predicted tides at Inverness exceed approximately 3.7 feet MLLW (KHE 2006a). However, tides did not increase water salinity from base levels of approximately 0.1 ppt until water levels in the creek reached approximately 5.1 feet and predicted tides at Inverness had risen to approximately 4.8 to 5.0 feet MLLW (KHE 2006a). The maximum salinity observed in this period occurred when predicted tides reached 5.73 feet at Inverness and was 1.5 ppt, with 1 ppt of seawater containing approximately 560 mg/L of chloride (KHE 2006a). Salinities quickly returned to baseline concentrations once tide levels dropped, suggesting that creek flows – which averaged 9.0 cfs during the monitoring period – quickly flushed salts out of this portion of the creek (KHE 2006a). In addition, no strong stratification occurred within this "pool," meaning that there was no meaningful difference in salinity between surface and bottom waters (KHE 2006a).

Because salinity intrusion has been believed historically to be related to surface flows or shallow subsurface flow governed by surface flows, the KHE model did not include groundwater. Data analysis and hydrodynamic modeling of surface water flows by KHE (2006a) focused primarily on conditions in the reach of Lagunitas Creek adjacent to the Coast Guard wells since 1997, after the old summer dam was discontinued. As flows during the monitoring period exceeded average and dry-year minimum flow requirements, KHE used the monitoring data to calibrate the hydrodynamic model and investigated maximum summertime salinities under both average-year (8 cfs) and dry-year (6 cfs) flows (KHE 2006a). Simulation results suggested that the highest salinities under average-year flows would be approximately 1.6 ppt and would exceed 1.5 ppt only 1 percent of the time. Under average-year summer flow and high tide conditions, simulated average salt concentrations would reach 700 mg/L in a 330-foot reach or section of Lagunitas Creek during a tide series where water levels exceed 5.5 feet MLLW and peak at over 6 feet MLLW (KHE 2006a). With a 2 cfs drop in streamflow to 6 cfs, maximum salinities would increase to approximately 3.2 ppt and would exceed 3.0 ppt less than 1 percent of the time (KHE 2006a). Under dry-year summer flow and higher high tide conditions, simulated average salt concentrations would climb to 1,692 mg/L in the 330-foot section of Lagunitas Creek adjacent to the Coast Guard wells (KHE 2006a). Because the model is incorporating extreme boundary conditions (freshwater to saltwater), the model sometimes overestimated and sometimes underestimated salinities relative to observed salinities, but differences between simulated and observed on the higher high tides modeled never differed more than by 0.3 ppt, which is well within generally accepted industry standards for hydraulic modeling (KHE 2006a).

Based on review and analysis of monitoring data and modeling results, KHE (2006) concluded that the process of chloride delivery to the wells is more complicated than simply intrusion of saltwater during high tides and low-flow events, and other mechanisms may be contributing or even account for delivery and sources of salt to the wells. Important observations, trends, and conclusions from the KHE study (2006a) and other studies are:

- Analysis of the long-term monitoring data from NMWD and data collected by KHE and the Park Service suggest that patterns in salinity observed since 1997 represent two superimposed – and possibly interconnected – trends.

- A large-scale, quasi-seasonal trend sometimes resembling a left-skewed bell curve in which salinity generally (but not always) increases abruptly in summer each year after streamflows drop below 9–10 cfs – often around July -- and continues to either steadily or incrementally increase through the summer to the fall or early winter when it peaks and then gradually tapers off through late winter and spring. The decrease in salinities appears to steadily taper off regardless of increases in stream discharge associated with reservoir releases or fall storm events. In some years, the bell curve pattern is not as strong, and/or salinities do not peak until as late as November.

- Superimposed on top of this large-scale, quasi-seasonal trend are a number of temporary (< 1 week in duration) spikes or increases in salinity that may contribute to the incremental increase in chlorides observed in the quasi-seasonal trend. These spikes as measured by the continuous quasi-conductivity or "Virtual Salinity" data collected by NMWD at its treatment plant show the following relationships:

    1) Occur only in periods of low flows less than 9–10 cfs;
    2) Typically occur in periods of maximum well-pumping rates (summer-time pumping rates);
    3) Occur only when spring tides exceed 5.5 - to 5.7 feet MLLW (even though higher salinity waters reach the vicinity of the Coast Guard wells when predicted tides at Inverness are as low as 4.8 to 5.0 feet MLLW).
    4) Consistently occur approximately 5- 10 days after a 5.5 to 5.7 feet MLLW spring or high tide event, typically during a neap or low tide event;
    5) Manifest as a single peak regardless of the number of days of high tide events the previous week;
    6) May potentially be connected with the large-scale, quasi-seasonal trend such that base-level chloride concentrations may rise in an incremental or stair-step fashion after each "spike" event;

- Boring logs for the Coast Guard wells indicate a 15-foot thick clay layer occupies the intervening area between the creek bed and the deeper water-bearing gravels in which the wells are screened (KHE 2006a). If this clay layer is laterally continuous, it would retard significant exchange of water and salts between creek and well intake (KHE 2006a). Questa (2000) provided some support for this finding, as it found that, in some areas, including within the estimated recharge area to the Coast Guard wells, the groundwater table appears to be confined or under pressure, presumably from an aquitard or stratum within the soils that confines water below.

- The similarity in seasonal chloride concentrations between the coastal marine terrace aquifer (Questa Engineering Corp. 2000) and Coast Guard wells (NMWD, unpub. data), coupled with the documented creekward gradient of terrace groundwater and observed shifting of the groundwater gradient near the wells due to drawdown by the wells (Questa Engineering Corp. 2000), suggest that the terrace aquifer may be at least one contributing source of chloride to the Coast Guard wells.

Based on the available information, KHE (2006a) has developed some preliminary conclusions regarding the possible scenario for salinity intrusion into the NMWD groundwater wells (KHE 2006a). Ultimately, salinity intrusion appears to be controlled by a combination of factors, including tidal height, streamflow discharge, pumping rates, and possible influence from the adjacent terrace groundwater aquifer. Based on virtual salinity or conductivity data, predicted tides at Inverness of approximately 5.5 to 5.7 feet MLLW appear to the threshold at which salinity "spikes' begin to occur, with tides exceeding 5.5 to 5.7 feet MLLW producing an almost linear response in virtual salinity levels such that the sharpness of the salinity "spike" appears strongly correlated with tidal height. Salinity intrusion events during which NMWD experience chlorides exceeding 100 mg/L appear to correlate with exceeding 5.9 to 6.0 feet MLLW (NMWD 1997, NMWD, unpub. data). The assumption in previous studies has been that the point of infiltration occurs at the Coast Guard wells. However, a number of factors, including the impervious stratigraphy where the Coast Guard wells are drilled; the discrepancy between when tidal influence occurs at the Coast Guard well (~4.8 to 5.0 feet) and the threshold at which virtual salinity begins to rise (~5.5 to 5.7 feet); and the long lag time between high tides and actual intrusion into the wells (~5 to 7 days), point to the point of infiltration being upstream of the section or reach of Lagunitas Creek adjacent to the Coast Guard wells. The triggers of salinity intrusion are described based on tidal water level elevation. It should be noted that potential effects of sea level rise would result in general increases in tidal elevations, subjecting the areas within the description area to greater tidal influence.

The exact point or points upstream of the Coast Guard wells where saltwater infiltrates the alluvial aquifer is unknown, but it is possible that at least one of the locations at which infiltration currently occurs is at the Downey Well. The Downey Well, drilled in December 1977 in the streambed gravel bar, is shallow, with bedrock occurring only 25 feet below ground surface. The well was taken out of service in 1982, because of continual maintenance problems and problems with the quality of well from the well (e.g., highly turbid; NMWD 1997). Since construction, Lagunitas Creek has migrated and "captured" the well, such that the well is now in the center of the creek (NMWD 1997). The well was operated infrequently between 1993 and 1997 for additional irrigation waters for Giacomini, but since 1997 and discontinuation of the gravel summer dam, it

has been used every summer to provide the Giacominis with irrigation water (NMWD 1997). As elevated chloride concentrations first occurred prior to drilling of the Downey Well, it is possible that there are other infiltration points, as well, where localized stratigraphy of the streambed allows or allowed infiltration of tidally influenced waters into the alluvial aquifer. Based on the fact that salinity intrusion prior to 1997 was associated with tides exceeding 6.4 feet MLLW (NMWD 1997), this infiltration point would probably also be upstream of the Coast Guard wells.

Hydraulic modeling information suggests that the Downey Wells should become exposed to tidal influence when predicted tides at Inverness reach 5.7 feet MLLW, which corresponds approximately to the tidal range (5.5 feet – 5.7 feet MLLW) at which spikes in virtual salinity or conductivity first become apparent at the Coast Guard wells (G. Kamman, KHE, *pers. comm*.). Pumping of the well during the summer may exacerbate salinity intrusion by increasing capture of tidally influenced waters into the alluvial aquifer. The role of pumping may account for the difference in lag time between high tides and salinity between summer and winter: during the early winter, when pumping rates are down, lag times appear to lengthen from 5 to 7 days to 10 days. From this potential infiltration point, located approximately 3,400 feet upstream of the Coast Guard wells tidally influenced waters would have to flow horizontally through the interbedded layers of alluvial gravels and fines to reach the Coast Guard wells and treatment plant. The exact amount of time that it would take waters from the Downey Well to reach the Coast Guard Wells would depend on horizontal conductivity rates of the alluvial aquifer soils, but 5- to 10 days appears reasonable based on the stratigraphy that is presumed to exist between these well locations (KHE 2006a).

During periods when stream discharge is below 10 cfs and pumping rates are elevated, spring tides move some distance upstream on Lagunitas Creek from the Coast Guard wells before they infiltrate into the alluvial aquifer. Once tidally influenced waters reach the Coast Guard wells, elevated summer-time pumping rates may increase horizontal hydraulic conductivity rates and promote capture of these waters by the Coast Guard wells. The contribution of pumping can be seen from the fact that, during periods when pumping rates drop during the summer and tides exceed 6.0 feet MLLW, the sharpness of the salinity spikes is reduced. The temporary tidally influenced "spikes" in salinity typically dissipate in less than a week. However, even after dissipating, they may potentially contribute to the incremental or stair-step pattern in salinity increases that appears to occur seasonally in chloride concentrations, at least during most years.

As freshwater flows increase and the frequency of spring tides decrease in the fall, chloride concentrations in the alluvial aquifer still tend to taper off very gradually, which may result in part from the fact that decreased pumping rates for both the Downey and Coast Guard Wells during the fall are reducing infiltration capacity and/or conductivity rates and thereby increasing the amount of time needed to "recharge" the alluvial aquifer with fresh water from the stream. Through the winter and spring, salts in the alluvial aquifer are steadily diluted with freshwater from increased stream discharge, except perhaps in periods or years where rainfall is very low.

By late spring of average and wet years, salinities have dropped to "baseline" conditions, which are probably determined by chloride concentrations in the adjacent terrace groundwater aquifer. Even in winter, chloride concentrations in groundwater sampled near the wells still ranged from 48 to 138 mg/L (Questa Engineering Corp. 2000). During dry years, the significant reduction in streamflow, particularly during past years when the SWRCB had not mandated minimum instream flow rates, may have increased the influence of this terrace groundwater aquifer on alluvial aquifer and may have exacerbated the problems with extremely low streamflow during the spring or high tide series that caused several salinity intrusion events during the 1976-1978 period. Even during average or wet years, the terrace groundwater aquifer may contribute to the incremental increase in chloride levels over the summer and fall. However, it is safe to assume that generally, the system involves both surface water-recharge of alluvial aquifers, perhaps at defined infiltration points or locations upstream of the Coast Guard wells, as well as some degree of lateral inflow from the terrace groundwater aquifer.

Wastewater Treatment and Disposal

Regional and Project Area Setting

The urban area of Marin County is unique in the way that it deals with its sewage disposal (Marin County Grand Jury 2003). In other urban areas, either cities/towns provide sewage collection and treatment (San Francisco), or a large agency provides these services for several cities and towns (East Bay Municipal Utility

District (Marin County Grand Jury 2003). In the urban area of Marin, more than 19 different sewer districts or agencies carry out this function (Marin County Grand Jury 2003). None of these agencies can require a property owner outside its boundaries to join the district and connect to a sewer line. For this reason, many homes in unincorporated areas of the county such as West Marin or even some within town limits are on individual sewage disposal systems that are located on-site, including septic tank and leach field systems, holding tanks, and seepage pits.

The number of on-site sewage disposal systems (OSDS) within the county is unknown. The County of Marin Environmental Health Services (EHS) has an inventory on microfiche (approximately 3,500), an inventory of parcels based upon permits issued (approximately 3,128), and an inventory developed using the Geographic Information System (GIS) (approximately 6,941 that meet the dollar threshold to be included; Marin County Grand Jury 2003). Although the combined lists have considerable overlap, EHS makes no claim that all individual septic systems within Marin County have been identified in the three inventories (Marin County Grand Jury 2003). It is possible that many of the oldest septic systems have not been included in these inventories (Marin County Grand Jury 2003).

Within the Tomales Bay watershed, the unincorporated areas are served almost entirely by various types of on-site sewage disposal systems. According to Marin County Community Development Department data, approximately 1,300 parcels within 100 feet of Tomales Bay and its tributaries have on-site disposal systems (RWQCB 2005). DHS conducted some additional studies in 2001and found that, of the known 2,260 parcels in the study area, approximately 1,600 parcels are assumed to have on-site disposal systems (DHS 2001 *in* RWQCB 2005).

Some exceptions to individual on-site treatment are the U.S. Coast Guard (USCG) housing complex, which operates a gravity-fed collection system feeding into three holding tanks with a total capacity of 13,000 gallons for approximately 150 homes (EDAW 2001). This waste is hauled out several times a week to the USCG's Two Rock facility for treatment (EDAW 2001). In addition, the community of Tomales opened a sewage collection and service system in 1977. The system is designed to handle waste from the existing residences and commercial establishments, the school facilities, and approximately 50 new residential units. Any development beyond that would require the expansion of the treatment plant facilities. In the mid-1970s, the USCG had proposed to collaborate with downtown Point Reyes Station in developing a community sewer and wastewater treatment facility, which would have utilized the Giacomini Ranch for spray irrigation, but the town did not approve funding for its share of the project (EDAW 2001).

One of the major issues that has been debated in recent years in relation to on-site disposal systems is the question of how well most of these existing systems are functioning and what role they are playing in Tomales Bay's water quality problems. In its 2001 study, DHS found that, of the parcels surveyed, many of the residences are unsuitable for an on-site disposal system (DHS 2001 in RWQCB 2005). The majority of the parcels lack sufficient available land to install an on-site disposal system that meets the required sanitary setbacks and construction standards, and site conditions reduce the potential for proper functioning of these systems.

Following these surveys, DHS gathered more information on on-site disposal system functionality through shoreline surveys, survey questionnaires, and file reviews (DHS 2001). The study concluded that, along the Tomales Bay shoreline, 134 systems have extremely limited area available to properly operate an on-site disposal system with a leach field (DHS 2001). Another 533 septic parcels are located within 100 feet of surface water, with 743 parcels between 100 and 500 feet from surface water (DHS 2001). There are at least 15 flood-prone parcels in the vicinity of Lagunitas Creek and Highway 1, and septic systems on these properties will likely fail during flood events (DHS 2001). All of the estimated 1,600 parcels with on-site disposal systems have poor soils for septic absorption fields as determined by USDA (DHS 2001). In a recent representative study conducted on the town of Marshall, 24 percent were considered to be failing, and another 16 percent were considered marginal (CSW/Stuber-Stroeh, Inc. 2002 *in* RWQCB 2005).

The County of Marin is currently planning to construct wastewater facilities on the east shore of Tomales Bay to serve up to 38 developed lots in the Marshall area, with possible future service of an additional 20 developed lots to the south (Leonard Charles and Associates 2007). The County may also propose to establish a new County Service Agency (CSA) to provide for operation and maintenance of community wastewater systems and to facilitate the local on-site wastewater management program (Leonard Charles and Associates 2007).

Regulatory and Policy Setting

The State of California regulates on-site disposal systems through the State Water Resources Control Board (SWRCB) and its districts, such as the San Francisco Regional Water Quality Control Board (RWQCB). California Water Code §13291(b) establishes minimum requirements for the permitting, monitoring, and operation of on-site disposal systems for preventing conditions of pollution and nuisance, although Regional Water Boards and local agencies implementing regulations retain the option of establishing requirements for on-site disposal systems that are more protective of water quality than the requirements contained in the code. These regulations apply to all new and existing on-site disposal systems, although they are addressed differently.

In Marin County, the RWQCB has ceded its authority over regulation of on-site treatment systems to the County. In 1971, the County of Marin enacted legislation (amended in 1978, 1984, and1987) that requires that construction of individual wastewater treatment systems be permitted by the County of Marin Environmental Health Services. It also directs the Public Health Officer to inspect all individual septic systems every two years and to approve their continued use (County Code 18.06; Individual Sewage Disposal Systems). In addition, when one or more bedrooms are added to a residential property, the Marin County Code requires an inspection of the septic system and, when necessary, requires that the septic system be upgraded. The Code prohibits construction, use, or maintenance of any component of an individual wastewater treatment system that is injurious to the public health and welfare or that is operated "in such a manner as to overflow onto public or private land or affect any river, stream, creek, spring, lake, pond, reservoir, swamp, ocean, bay, water supply, or water system."

On-Site Sewage Disposal Systems in the Project Area and Vicinity

Almost all of the parcels in Point Reyes Station and Inverness Park that adjoin the Project Area probably currently rely on on-site sewage disposal systems. Approximately 65 percent of the Project Area's eastern perimeter in Point Reyes Station is adjacent to parcels with on-site sewage disposal systems. Because these are individually owned and operated systems, information about the type and age of system and the exact location of these systems is not available. However, most of these systems are probably similar to those commonly used in the rest of Point Reyes Station, such as septic, cesspools, mound systems, and other methods that discharge into the ground. As most of the parcels in Point Reyes Station are on an elevated mesa that is anywhere from 30- to 50- feet higher than the pastures, most septic systems would be expected to be from 18- to 40- feet above the general grade of the pasturelands in the Giacomini Ranch. Within the Dairy ranch facility, the house and some of the outlying buildings probably incorporate some type of on-site sewage disposal.

The southern perimeter of the Project Area is the least developed and, therefore, would be expected to have the fewest number of septic systems. Approximately 40 percent of the southern perimeter falls adjacent to parcels that probably have on-site sewage disposal systems.

The entire (100 percent) of the western perimeter of the Project Area is bordered by parcels that likely have on-site disposal systems. Most of these homes are constructed on the slopes of the Inverness Ridge and are, therefore, at least 5 feet or more above the general grade of the surrounding pasturelands. At least four to five parcels with residential development are directly contiguous with the West Pasture. While detailed schematics are not available, the layout of the parcels would suggest that leachfield development primarily occurred at the rear of the houses.

These systems were constructed at the apex of alluvial fans, which are comprised of depositions of angular, coarse-grained sand to fine-grained granitic gravel material emanating from the mouths of creeks draining off the Inverness Ridge as flows abruptly reach the much lower gradient elevations of the West Pasture (KHE 2006a). Two (2) of the four (4) properties adjoining the West Pasture with on-site wastewater disposal systems are located within 100 feet of a stream, and a third is located within 100- to 500 feet of a stream. These parcels are subject to regular flooding by these creeks under even small- to medium stormflow events and also lie in the 100-year floodplain for Lagunitas Creek.

In addition to numerous creeks, the Inverness Ridge also discharges a considerable amount of groundwater that emerges in many areas at the base of the Inverness Ridge and either sheetflows across the pasture or travels sub-surface in a shallow water table (KHE 2006a). Based on monitoring of water tables conducted as part of the proposed project, it would appear that the groundwater table falls approximately 3 – to 9 feet

above the groundwater table during most of the season, although, depending on the parcel, leach fields may be subject during rainfall events to regular surface flooding from Inverness Ridge creeks and an increase in emergent surface and sub-surface groundwater flow into the West Pasture.

Traffic and Transportation

The sharp juxtaposition between parkland and rural communities has significantly increased the potential for transportation problems along West Marin's largely narrow, two-lane road system, particularly considering its proximity to the highly urbanized San Francisco Bay watershed. In general, Marin County is progressive in terms of encouraging alternative transportation, but even alternative transportation sometimes comes with economic or environmental "costs" that makes implementation a delicate balancing act between competing social and ecological issues. This is nowhere more evident than in West Marin, where community members have sought for decades ways of improving safe and energy-efficient alternative transportation for both residents and visitors, but have had efforts stymied by the fact that most potential routes would cause impacts to the very natural resources that have drawn most of these people to live or visit here. These issues are complicated further by the fact that seemingly similar objectives such as increasing bicycle and/or pedestrian access are motivated by different and often conflicting goals such as transportation versus nature experiences that may ultimately lead to different types of solutions. Within this document, the issue of pedestrian and bicycle "transportation" is addressed under Traffic and Transportation, while trails and other types of public access for both visitors and local residents are addressed under Visitor and Resident Experience. Resolution of these complex environmental and social issues will require a delicate balance to be struck between competing concerns, values, and resources.

Regulatory and Policy Setting

Within Marin County, policies on transportation largely focus on reducing congestion, while encouraging alternative modes for transportation, including use of mass transit and bicycle and pedestrian access.

In August 2005, President Bush signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) into law. SAFETEA-LU is a comprehensive bill that funds various surface transportation programs at a total of $286 billion over five years and includes many provisions relating to the Park Service, including reauthorization of the Park Roads and Parkways Program (PRPP) and a new alternative transportation program for parks and other public lands. On a state level, Propositions 111 and 116 passed by voters in 1990 triggered state legislation requiring urban counties to establish a Congestion Management Agency (CMA) to create, update, and administer a Congestion Management Plan (CMP) for the county. The purpose is to establish Levels of Service (LOS) for designated freeways, state highways, and local arterials and to maintain those standards by increasing capacity or managing travel demand on those roads. The CMA annually monitors service levels on freeways, state highways, and routes of regional significance as part of the annual update. State Route 1 from SFD to PRS is part of the designated roadway network. Under CEQA, the County also evaluates changes in traffic conditions, with projects creating changes dropping the Level of Service (see description below) below Level D considered a "significant" impact.

Within the Coastal Zone, which incorporates the Project Area, the LCP (Marin County Comprehensive Planning Department 1981) specifically identifies Sir Francis Drake Boulevard as providing a scenic driving experience for coastal visitors and an important access road for local residents. The LCP (Marin County Comprehensive Planning Department 1981) notes that, "in order to protect its scenic rural character, the road shall be maintained as a two-lane roadway." The LCP (Marin County Comprehensive Planning Department 1981) concluded that "Sir Francis Drake has adequate capacity to handle increased recreational and local traffic, although traffic patterns do occasionally create hazardous conditions for pedestrians and bicyclists in the areas of Inverness and Inverness Park." In addition, the LCP (Marin County Comprehensive Planning Department 1981) identified the need to expand public trails and bike paths both on federal and non-federal lands, but also stresses the need to ensure that they are compatible with the protection of natural resources and "the unique qualities of Marin's coast." Specifically, the concept of a bike/pedestrian trail network that would connect the villages and provide access to public parks was supported (Marin County Comprehensive Planning Department 1981). This issue is discussed further under Visitor and Resident Experience.

The Point Reyes Station Community Plan (Marin County Community Development Agency 2001) focused on the lack of off-street parking as a concern, given the steady increase in numbers of visitors and area residents. All new structures and uses are required to provide off-street parking scaled to the level of use

(Marin County Community Development Agency 2001). The Community Plan (2000) also supports efforts to reduce congestion through alternative transportation, including efforts to identify appropriate locations for paths that could be used for both bicycle commuting and recreation, including investigations into the feasibility of using the abandoned railroad right-of-way.

Transportation Patterns and Traffic Issues in the Project Area and Vicinity

In general, existing and projected future transportation issues are defined, at least for roads and intersections, using Level of Service (LOS) criteria. Separate criteria are established for roads, signalized intersections, and stop sign-controlled intersections. LOS for intersections is typically based on the amount of delay measured in seconds between when a vehicle reaches an intersection, including a queue, and when it passes through the intersection. LOS for roadways uses a Volume-to-Capacity ratio based on conditions of free flow and the amount of restriction on maintaining speed limits or safe speeds for roadway conditions within designated areas. Criteria applicable to the Project Area are shown in Tables 22 and 23.

TABLE 22. STOP SIGN-CONTROLLED INTERSECTION LOS DESIGNATIONS

LOS	Vehicle Delay (seconds)	Description
A	<10	Little or no delay.
B	>10 – 20	Short traffic delay.
C	>20 – 35	Average traffic delay.
D	>35 – 55	Long traffic delay.
E	>55 – 80	Very long traffic delays.
F	>80	Excessive traffic delays.

Source: Highway Capacity Manual Third Edition

TABLE 23. ROADWAY LOS DESIGNATIONS

LOS	Volume to Capacity (V/C) Ratio		Description
	Freeways	Arterials	
A	0.00 – 0.35	0.00 – 0.60	Conditions of free flow. Speed is controlled by driver's desires, speed limits or physical roadway conditions, not other vehicles.
B	0.36 – 0.54	0.61 – 0.70	Conditions of stable flow. Operating speeds beginning to be restricted, but little or no restrictions on maneuverability.
C	0.55 – 0.77	0.71 – 0.80	Conditions of stable flow. Speeds and maneuverability somewhat restricted. Occasional back-ups behind left-turning vehicles at intersections.
D	0.78 – 0.93	0.81 – 0.90	Conditions approach unstable flow. Tolerable speeds can be maintained but temporary restrictions may cause extensive delays. Speeds may decline to as low as 40 percent of free flow speeds. Little freedom to maneuver, comfort and convenience low.
E	0.94 – 1.00	0.91 – 1.00	Unstable flow with stoppages of momentary duration. Average travel speeds decline to one-third the free flow speeds or lower, and traffic volumes approach capacity. Maneuverability severely limited.
F	>1.00	>1.00	Forced flow conditions. Stoppages for long periods, and low operating speeds (stop-and-go). Traffic volumes essentially at capacity over the entire hour

Source: 2003 Performance Measures Monitoring Report Highway Capacity Manual Third Edition

The Project Area only has two road segments within its boundary – a portion of a regional roadway, Sir Francis Drake Boulevard or Levee Road, and a portion of Bear Valley Road. Otherwise, most of the roads occur at the perimeter or in the vicinity of the Project Area and include a variety of state, regional, and local roadways. Existing conditions for these roads, as well as for parking, mass transit, and other transportation modes, is discussed in more detail below.

While LOS is often provided only for current conditions, projections can be made into the future based on anticipated increases in population or visitation to an area. The Seashore contracted with BRW and Lee Engineering (1998) to provide an evaluation of existing and projected future conditions on Park Service, state, and county roads. To assess future conditions, BRW and Lee Engineering (1998) analyzed trends in the San Francisco Bay region population growth and trends in visitation and conclude that visitation would increase 1 percent annually from 1998-2010. Based on this conclusion, traffic count data for local, regional, and state roadways were factored by a growth rate of 1.0 percent per year to evaluate impacts of increases of this magnitude on LOS within the general Point Reyes area (BRW and Lee Engineering 1998).

However, since 1998, park visitation has not increased 1 percent annually. Visitation reached a peak of 2,579,949 in 1992 (NPS, unpub. data). In 1998, visitation totaled 2,477,409 (NPS, unpub. data). In 2004, visitation actually had dropped to 1,960,055, a drop of 21 percent (NPS, unpub. data). Visitation rose slightly in 2005 to 1,988,585 (NPS, unpub. data). However, BRW and Lee Engineering had projected that visitation would total 2,750,000 in 2005 based on a 1 percent annual increase, a difference of 28 percent or 761,415 annual visitors relative to actual numbers of visitors in 2005. By 2010, annual visitation was projected to climb to 2,890,000 (BRW and Lee Engineering 1998). If visitation increased annually from 2005 by 1 percent, it would reach 2,090,023, approximately 28 percent lower or 799,977 fewer visitors than originally projected

State Highways. State Route 1 is the only major regional highway located in the vicinity of the Project Area. State Route 1 is one of the most scenic roadways in the state, offering panoramic and often breath-taking views of California's frequently rugged and remote coastline. The scenic beauty of this roadway makes it a favorite of television commercial producers. The winding and heavily traveled highway hugs the outer coastline of California from southern California to the Lost Coast just north of Fort Bragg. Within Marin County, State Route 1 separates from Highway 101, the main highway in eastern Marin County, just north of the Golden Gate Bridge, heading westward from Mill Valley to the outer coast, where it again begins its winding route up the coast. In the vicinity of the Project Area, State Route 1 goes through the small town of Olema before it enters Point Reyes Station, where it temporarily turns into A Street (see Local Roadways below). Once north of Point Reyes Station, State Route 1 begins to curve westward to follow the eastern boundary of Tomales Bay towards Marshall and Bodega Bay.

Between Olema and Point Reyes Station, it is a two-lane, north-south trending roadway with average annual daily traffic volume of 6, 100 vehicles south and 2,300 vehicles north of Pt Reyes Petaluma Road (DKS Associates 2001 *in* EDAW 2001). The CMA regularly evaluates LOS on the portion of State Route 1 between Sir Francis Drake Boulevard in Olema and Point Reyes Station (DKS Associates 2001 *in* EDAW 2001). A 2000 CMA survey characterized this portion of State Route 1 as Level B LOS in both directions, northbound and southbound, during the afternoon peak hour (DKS Associates *in* EDAW 2001; Tables 21A and 21B). North of Point Reyes Station, LOS drops to Level C for both morning and afternoon peak hours. The design capacity of State Route 1 and some of the other roadways in the area is approximately 34,000 vehicles per day: as of 1996, vehicle trips on State Route 1 amounted to approximately 20 percent of capacity, ranging from 6,100 to 6,800 vehicles per day (Marin County Community Development Agency 2001). No change in LOS is anticipated between 1998 and 2010, even given a projected – and possibly not realistic – increase in Point Reyes area visitation of 1 percent per year (BRW and Lee Engineering 1998).

Regional Roadways. Sir Francis Drake Boulevard, including Levee Road, which is technically the southernmost portion of Sir Francis Drake, is the only regional roadway located in the vicinity of the Project Area. As was noted earlier, it was specifically referred to in the LCP (Marin County Comprehensive Planning Department 1981) as providing both a scenic driving experience, as well as being an important access road for residents living on the Point Reyes Peninsula.

Sir Francis Drake Boulevard, which originates in eastern Marin County, runs primarily as a two-lane road once east of the town of Fairfax through the towns of Woodacre, Forest Knolls, Lagunitas, and Tocaloma before stopping at State Route 1 in the town of Olema. From Olema, the road picks up again at Levee Road near the Green Bridge in Point Reyes Station. Traffic traveling south on Levee Road is controlled using a stop sign, but there is no stop sign for vehicles on State Route 1. Levee Road moves through a small residential area as it curves westward and crosses the northern end of Olema Marsh. The road then curves northward to follow the western edge of Tomales Bay as it becomes the main and only road for residents of Inverness Park, Inverness, other private developments on the Inverness Ridge, ranches within the Point Reyes headlands, and visitors to the Seashore and State and County Parks such as Tomales Bay State Park and Chicken Ranch Beach. Seashore visitors use this road to access Drake's Estero, Tomales Point, Abbott's Lagoon, the Lighthouse, Chimney Rock, and many other beaches along the Point Reyes Headlands.

A LOS Analysis was performed on the portions of Sir Francis Drake Boulevard just east of the town of Olema and west of the intersection with Pierce Point Road rated this portion of the regional roadway generally as Level D during both morning and peak hours (BRW and Lee Engineering 1998). However, the portion near Pierce Point Road had slightly better traffic conditions during morning peak hours (Level C; BRW and Lee Engineering 1998). LOS was not anticipated to change greatly between 1998 and 2010 in either location, even given the projected – and possibly not realistic – increase in Point Reyes area visitation of 1 percent per year (BRW and Lee Engineering 1998).

Collectors and Local Roadways. A Street corresponds to the in-town portion of State Route 1 within the town of Point Reyes Station and is the main downtown street in Point Reyes. Within town, State Route 1 is a two-lane road with a posted speed limit of 25 mph. Mesa Road is a local roadway that runs along the eastern portion of Point Reyes Station and the main roadway serving the Point Reyes Mesa residential development. It has several curves and corners. A portion runs along the Giacomini Ranch property in the vicinity of Tomasini Creek, which flows underneath Mesa Road, and the small dirt road that leads to the Giacomini Hunt Lodge. From Mesa Road, several smaller roads – some of which are considered private – provide access for residents who live on the Point Reyes Mesa directly adjacent to the northern portion of the Giacomini Ranch East Pasture. Mesa Road eventually curves eastward and ends at State Route 1 on the northeastern boundary of Point Reyes Station. A stop sign at the intersection with State Route 1 controls crossing of the state highway, which does not have a signal or stop sign.

In the town of Point Reyes Station, B and C Streets parallel A Street to the west and are less heavily traveled than A, serving primarily residences and commercial businesses and public services such as the Sheriff's substation and Fire Station. C Street runs along the eastern perimeter of the Giacomini Ranch Dairy Facility. B Street has a stop sign at its T-intersection with State Route 1, but there is no stop sign for cross-traffic on State Route 1. There are three other stop-sign controlled intersections on B Street. There are no stop signs on C Street.

At the eastern end of town, another local arterial road, Point Reyes-Petaluma Road, serves as an important connection between Point Reyes and towns such as Nicasio, Novato, and Petaluma.

A more direct connection between the portion of Sir Francis Drake Boulevard that ends in Olema and the portion near Inverness Park is Bear Valley Road, which starts in Olema and runs north-south until it dead-ends into Sir Francis Drake Boulevard. The intersection has a stop sign for vehicles traveling north on Bear Valley Road, but there is no stop sign for cross-traffic on Sir Francis Drake Boulevard. Most of this road runs through undeveloped areas such as pasture, with the exception of the Park's administrative headquarters and Bear Valley Visitor Center and a relatively small residential development at the northern end of the road near the intersection with Sir Francis Drake Boulevard. Visitors to the park use Bear Valley Road to access the Bear Valley Visitor's Center, Bear Valley Trail and associated trails and remote camping areas, as well as Limantour Road, a Seashore-maintained road that crosses over the Inverness Ridge to Limantour Beach. This road also provides access to a youth hostel and to several Seashore-owned residences in the vicinity of the youth hostel and the Limantour Beach area. Limantour Road has a stop sign at its intersection with Bear Valley Road, but there is no stop sign for cross-traffic on Bear Valley Road.

Within the town of Inverness Park, several small roads connect residences with homes constructed on the slopes of the Inverness Ridge, including Drakes View Drive and others.

At the northern end of Sir Francis Drake Boulevard, Pierce Point Road connects visitors, park employees, and rancher residents with the Tomales Point area, including Abbott's Lagoon, McClure Beach, Tomales Bay State Park. Some of the quarries proposed for restoration with use of excavated sediment from the Project Area would be accessed from Pierce Point Road.

LOS information for A Street is discussed under State Highways. Point Reyes-Petaluma Road was rated as Level C during both morning and afternoon peak hours (BRW and Lee Engineering 1998). The LOS analysis for Bear Valley Road characterized it as Level D under both morning and afternoon peak hours and under existing and projected future growth conditions (BRW and Lee Engineering 1998). Pierce Point Road had a lower LOS south of Tomales Bay State Park (LOS C) than north of the park, where LOS increased to Level B, at least in the morning (BRW and Lee Engineering 1998). Another local arterial road, Point Reyes-Petaluma Road, was rated as Level C during both morning and afternoon peak hours (BRW and Lee Engineering 1998).

Intersections. None of the intersections within the vicinity of the Project Area are signalized. There are approximately 12 intersections within the vicinity of the Project Area that are stop sign-controlled. The

majority (10) are T-intersection stop signs or single stop-sign intersections in which cross-traffic is allowed to flow freely. Two intersections in the town of Point Reyes Station are either four-way stop sign-controlled or two-way stop sign-controlled at a four-way intersection with cross-traffic allowed to flow freely. Again, as explained earlier, at intersections, LOS is defined as the average total delay in seconds per vehicle from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line, including the time from the back to the front of the queue. Some typical LOS for intersections without signals in the vicinity of the Project Area are given below ((DKS Associates 2001; EDAW Inc. 2001)).

- *State Route 1 and Sir Francis Drake Boulevard/Levee Road*: Morning Peak Hour (Level A); Afternoon Peak Hour (Level B); Weekend Mid-Day Peak Hour (Level B).
- *State Route 1 and Mesa Road near Green Bridge*: Morning Peak Hour (Level B); Afternoon Peak Hour (Level B); Weekend Mid-Day Peak Hour (Level B).
- *State Route 1 and Mesa Road near Greenbridge Gas*: Morning Peak Hour (Level A); Afternoon Peak Hour (Level A); Weekend Mid-Day Peak Hour (Level A).

Emergency Vehicle Access. The Marin County Fire Department is located at 201 B Street. Average response time for the fire department is 5 minutes (DKS Associates 2001 *in* EDAW 2001). Emergency vehicles currently have access to the Project Area from C Street and the Dairy Mesa facility and Sir Francis Drake Boulevard near the town of Inverness Park. Emergency vehicles currently experience little or no delay in accessing the Project Area during the morning, evening, and weekend peak hours, because of immediate proximity and/or high levels of service at the relevant intersections. Emergency access to the interior of the Project Area is somewhat limited. Compacted earthen roads would allow some degree of access, unless roads are flooded or extremely wet to most of the East Pasture. However, there are no existing ranch roads in the West Pasture, although a dirt track does allow 4 wheel-drive (4-WD) vehicles to enter the West Pasture near the Gradjanski residence and cross Fish Hatchery Creek at a creek crossing. In addition, there is a gate at the southern end of the West Pasture that allows 4-WD access at the southern end. Access at the northern end is largely foot access via the north levee.

Parking. BRW and Lee Engineering (1998) did not analyze parking capacity in the Project Area and immediate vicinity. However, parking capacity was qualitatively assessed for existing and future parking needs in other areas of the Seashore by rating parking capacity from very high to very low (BRW and Lee Engineering 1998). Parking lots with very high capacity were those in which occupancy does not exceed 90 percent of capacity during weekdays and weekends regardless of season, while areas with very low parking capacity are more than 90 percent full during most weekdays and weekends regardless of season (BRW and Lee Engineering 1998).

On-street parking in downtown Point Reyes Station has historically been a subject of community concern. On-street parking represents a large share of the downtown parking facilities. Approximately 40 percent of the homes on the west side of Point Reyes Station do not have driveways, carports, or garages, necessitating on-street parking. As visitation to Point Reyes Station increases, competition for on-street parking spaces will increase and cause additional impacts to residents and merchants in town. The Point Reyes Station Community Plan (Marin County Community Development Agency 2001) identified localized parking congestion in the downtown area as a major concern. Furthermore, on-street parking has also been identified as an impediment to improving the traffic capacity of downtown streets. According to the LCP (Marin County Comprehensive Planning Department 1981), "parking restrictions and limits on recreational vehicle travel could also substantially improve capacity. On some streets, cars park "nose-in," which increases capacity relative to parallel parking, but decreases overall traffic capacity.

Public use of informal social paths or trails on the Giacomini Ranch levees have resulted apparently in periodic parking problems periodically both in the vicinity of Third and C Streets in Point Reyes Station and along Sir Francis Drake Boulevard. There are no designated formal or informal parking areas for the Giacomini Ranch East Pasture and Green Bridge County Park trail network. Most people park alongside homes on 3rd and C Street in Point Reyes Station or walk to the trail from other parts of town. Because there are no designated formal or informal parking areas, street parking is often at a premium on most weekends in the town of Point Reyes Station, with people parking along C Street or Third Street. This increases parking and traffic congestion, noise, and trash for residents on Third Street. Parking along C Street typically occurs along the side fences of residences, business, or public service operations, as no homes actually front C Street. Parking on Third Street occurs in front of homes. While use of this trail is not heavy relative to formal Park Service trails such as Bear Valley Trail and appears to be mainly used by local residents, nearby homeowners state that the trail is attracting increasing numbers of people from other communities looking for opportunities to walk their dogs. Because of overflow problems from Point Reyes Station, it is likely that the worst problems

occur on weekends when visitors need to park further from downtown because of the limited number of parking areas near A Street. They end up vying for parking with the limited number of people using the informal social path during that time. Because parking occupancy probably exceeds 90 percent on most weekends, particularly during the high season, parking capacity for this particular area might be rated between low and medium.

Two formal parking lots serve existing trails in the Project Area and vicinity. There is a parking lot at the trailhead for Tomales Bay Trail with approximately 14 parking spaces that generally has, based on the BRW and Lee Engineering criteria, very high parking capacity and another parking lot at White House Pool County Park with approximately 43 parking spaces that might be rated as having medium to high capacity.

Parking for the informal social path on the Giacomini Ranch north levee consists of one or more roadside pull-outs that can comfortably fit approximately 23 vehicles. Because this path is not as heavily used, parking and pull-outs into traffic along Sir Francis Drake Boulevard are typically not problematic, and parking capacity might be rated as very high. However, between December and February, many birdwatchers flock to "Waldo's Dike" to observe California black rails in the undiked marsh north of Giacomini Ranch and use the levee for access. Parking during peak visitation periods such as weekends can become chaotic, with pull-outs full and vehicles parking haphazardly along Sir Francis Drake Boulevard where there is no road shoulder. With vehicles often in the actual roadway, this parking pattern impacts road safety and decreases vehicle conveyance and LOS. Use by birdwatchers, some of whom come from all over the state to view rails, is limited to extreme high tide events, which, during December, January, and February, occurs usually for four days each month. The worst parking problems comes when one or more of those days coincide with the weekend, and, because of these problems, parking capacity would probably receive an overall rating of medium capacity, in which occupancy does not exceed 90 percent except during weekdays and weekends in holiday and high season periods.

Public Transportation. Golden Gate Transit provides daily bus service within Marin, Sonoma, San Francisco, and Contra Costa counties. During the week (Monday through Friday, the West Marin Stagecoach provides service between San Anselmo, Point Reyes Station, Inverness Park, and Inverness. The West Marin Stagecoach started in 2002 as a two-year demonstration service created by Marin County that focused on increasing access for seniors, youths, and others to medical, civic, educational, work, and shopping sites throughout Marin. At least initially, the Stage was funded by the Marin County Transit District, the County of Marin, and the Federal Transit Administration. Money from the sales-tax hike (Measure A) passed last November 2004 apparently ensured the future of the West Marin Stagecoach.

During the week, the Stage's 12-passenger buses have four east- and west-bound runs each day, with the last eastbound run leaving at approximately 5 p.m. from Point Reyes. There are at least three formal stops in the vicinity of the Project Area at the Dance Palace in Point Reyes Station, downtown Point Reyes Station, and Inverness Park. Published travel time from Point Reyes Station to San Anselmo is approximately 54 minutes. The Stage also has the capability of carrying two bikes on outside bike racks. Golden Gate Transit used to provide one route on the weekends that served Point Reyes Station (Route 65), but it no longer runs.

Alternative Transportation. Pedestrian activity is generally light within the vicinity of the Project Area. As noted earlier, use of the informal social paths and other trails in the vicinity is discussed more fully under Visitor Experience. Pedestrian traffic in the western portion of Point Reyes Station is very light and limited to residents, users of the informal social path, and, on weekends, visitors parking on the outskirts of town. Residents occasionally walk or casually bicycle on the shoulder of Sir Francis Drake Boulevard and Levee Road, but use is limited, probably due to concerns about safety due to the narrowness of the shoulder in some areas. Many of those walking or casually bicycling are linking to the White House Pool County Park at the intersection of Levee, Sir Francis Drake, and Bear Valley Roads, which has a weather-dependent dirt trail that runs along the south side of Lagunitas Creek (see Visitor Experience). In addition to casual bicyclists, long-distance road cyclists also frequent the Point Reyes Station and Inverness Park areas, particularly on weekends. While casual bicyclists will often ride on the dirt shoulder, road cyclists typically hug the paved edge of the roadways, which are all two-lane and narrow to moderately wide. None of the highways or roadways discussed has formal bike lanes.

For several decades, residents of southern Tomales Bay have discussed the possibility and effects of creating a pedestrian and bicycle trail that would link the western portion of Tomales Bay near Inverness to Point Reyes Station and potentially even further north along State Route 1. The first formal attempt to address this issue was the West Marin Pathways Study, completed in 1988 by Brian Wittenkeller and Associates for West Marin Paths, a local non-profit group, and Marin County. This document incorporated a detailed conceptual

plan and cost estimate for a bicycle and pedestrian pathway system around the south end of Tomales Bay, including several alignments adjacent to or crossing over into the Giacomini Ranch. The concept plan was very comprehensive and ambitious (LandPeople 2005). It included recommendations for bike lanes and/or paved multi-use paths along much of the route, including many routes that were on the then-private Giacomini property (LandPeople 2005). It did not include a detailed evaluation of environmental, construction, and maintenance constraints, and requirements (LandPeople 2005). The West Marin Pathways Study was never adopted, although two small components were reportedly constructed by either the County or others – a cantilevered pedestrian causeway at White House Pool and a bridge across the eastern Bear Valley Creek outlet in White House Pool County Park. According to local residents who participated in the process, this was because of the high (for the time) estimated implementation cost and concern over environmental and adjacent landowner impacts. The estimated cost for the pathway improvements was approximately $2.75 million for design, construction, and construction contingencies, plus $1.5 million for land acquisition (LandPeople 2005).

A more recent pertinent document that was adopted by the County is the June 2001 *Marin County Unincorporated Area Bicycle and Pedestrian Master Plan*, prepared by Alta Transportation Consulting for the Marin County Department of Public Works (LandPeople 2005). This document contains analysis; goals, objectives and policies; a proposed system and improvements plan; and specific projects (LandPeople 2005). Among the projects is a recommended series of improvements in the Point Reyes and Inverness Area, including a potential bike/pedestrian path from the Point Reyes Station to Inverness (LandPeople 2005). The Plan refers to the 1988 West Marin Pathways Study. The Plan also recommends the use of railroad right-of-way, where feasible, to complete the recommended routes (LandPeople 2005). The Plan does not go into detail on the precise location or configuration of these bicycle routes, but does include bikeway standards that imply the routes would be either paved Class I separated multi-use path at least 8' wide, or paved bike lanes 4 to 5' wide on the road shoulder (LandPeople 2005). The draft Marin CWP also shows a proposed trail along Levee Road and Sir Francis Drake Boulevard the entire distance to Inverness, but the map does not specify the type of trail (LandPeople 2005).

Visitor and Resident Experience – Public Access Resources

National parks are valued for the recreational and aesthetic resources they provide to the public, both visitors and adjacent residents. Park visitors expect national parks to provide beauty, a sense of quiet, and opportunities for hiking, bird-watching, and other recreational pursuits. Perhaps, some of the most valued natural resources within parks in terms of sheer visitor numbers are "wetland" ones such as rivers, lakes, oceans, waterfalls, and even geysers. While earlier sections have focused on utilitarian ecological and social functions of wetlands such as water quality improvement or floodwater retention, wetlands undeniably provide other important social services, one of which is recreation. Wetlands offer opportunities for hiking, birdwatching, fishing, kayaking and canoeing, boating, and swimming. In addition, wetlands can provide breathtaking vistas or viewsheds. These recreational benefits are one of the reasons that the public has come to increasingly value wetlands.

As discussed under Traffic and Transportation, increasing emphasis on alternative transportation means such as walking and bicycling has added another dimension to public access traditionally encountered in parks, which focuses on providing visitors with a natural experience. For exercise or to improve the environment, an increasing number of people are looking to use trails and paths for transportation purposes. While, overall, the objective appears to be the same, bicycle and/or pedestrian public access, differences in the goals of these user groups – transportation versus nature experience – can result in very different solutions that may not be mutually satisfactory. For the purposes of this document, bicycle and pedestrian issues related primarily to transportation are covered under Traffic and Transportation, while this section focuses primarily on public access for natural and recreational purposes.

Regional and Park Setting

As a region, the San Francisco Bay area has actively sought opportunities for providing public access to both its residents and visitors. Agencies such as the Bay Conservation and Development Commission have taken a very proactive role in increasing access along the edge of San Francisco Bay, project by project. Perhaps, the most ambitious regional effort is the San Francisco Bay Trail, a planned recreational corridor that, when

completed, encircle the San Francisco Bay region with a continuous 400-mile network of bicycling and hiking trails, of which 240 miles have been completed.

With more than 50 percent of its lands in public ownership or conservation easement, Marin County is one of the leaders in the San Francisco Bay region in terms of providing access to both residents and visitors. Some of the largest tracts of undeveloped land within the county are its national parks, including the Seashore and north district of GGNRA. While many parks primarily serve visitors who come from outside the park's region, the majority of the 2.5 million visitors who come to the Seashore each year live in the San Francisco Bay area. In 2002, more than 700,000 visitors visited the three Seashore visitor centers, and more than 70,000 visitors had extended contacts with park interpretative staff through ranger-led programs. The main visitor is at Bear Valley near the park's administrative headquarters, which serves 350,000 people annually. The nearby trail, the Bear Valley Trail, is the most heavily used trail, with 70 percent of visitor centers users believed to use the trail (J. Dell'Osso, Seashore*, pers. comm*.).

Some of the largest tracts of undeveloped land within the county are its national parks, including the Seashore and north district of GGNRA

The Seashore provides backcountry campgrounds, numerous beaches, and 147 miles of hiking trails. Activities include hiking, water sports, horseback riding, fishing, camping, wildlife viewing, and other interpretive opportunities. Hiking is primarily a day-use activity. There are approximately 50 trails throughout the Seashore, and they are found in a range of habitat types, ranging from wooded mountains to sandy beaches. Overnight stays are possible in four backcountry campgrounds, the Stewart Horse Camp, the Point Reyes Hostel, a private campground, and local hotels and inns. Visitors bring horses daily to ride on designated trails, and hundreds rent horses every week from commercial stables.

Though Stinson Beach and Bolinas attract more surfers, North Beach is known as a challenging surfing area. Nature study and wildlife viewing are important activities at Point Reyes. Visitors make special trips to the Seashore to see migrating whales, shorebirds, breeding elephant seals, tule elk, and spring wildflowers. Information received from visitor surveys conducted by Sonoma State University (NPS 1997; 1998b) found that most park visitors spend 2-6 hours at the Seashore in a variety of activities dependent upon the season, ranging from whale watching and kayaking to hiking and bird watching.

The attractiveness of the Point Reyes area to visitors and residents is enhanced by the fact that the western portion of Marin County remains largely undeveloped, even those portions not owned by the Park Service. The pastoral setting of the largely agricultural community draws many visitors, who enjoy both viewing the working farms and purchasing some of the locally produced products in stores within local towns. The beauty of the area has also led to an active artist community that caters to visitors. Tomales Bay itself – portions of which fall within the Seashore and GGNRA boundaries – attracts people interested in the thriving oyster industry and abundant water-based recreational opportunities such as boating, kayaking, and swimming. The "open space" opportunities offered by the Seashore and GGNRA have been greatly enhanced through creation of numerous other open space areas and parks in western Marin County by local and state agencies, including Marin Municipal Water District lands, County Open Space lands, Mt. Tamalpais State Park, Tomales Bay State Park, and several small County Parks at White House Pool, Green Bridge, and Chicken Ranch Beach.

Regulatory and Policy Setting

The Park Service 2006 Management Policies emphasizes that "providing opportunities for appropriate public enjoyment is an important part of the Service's mission" (NPS 2006, Section 8.1). In fact, public education and enjoyment could be considered an integral component of the wetland restoration process. "When practicable, the Service will not simply protect, but will seek to enhance, natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions" (NPS 2006, Section 4.6.5). In 2003, the Seashore published a report that evaluates in detail the condition and maintenance and upgrade needs of existing trails (Seashore 2003). The Trail Inventory and Condition Assessment with Recommendations report (2003) also discusses the need and potential for new trails, including the potential for trails in or adjacent to the newly purchased Giacomini Ranch (Seashore 2003). It notes that one of the tasks will be to determine "appropriate levels of public access for interpretive and educational uses … Because the bulk of the property will be devoted to marsh restoration, it appears unlikely

that major through-trail routes will be feasible (with the possible exception of a portion of the Tomales Bay west shore trail as described in the Marin Countywide Trails Plan)" (Seashore 2003).

Marin County also actively supports enhancement of public access and recreation. Within the Coastal Zone, the LCP (Marin County Comprehensive Planning Department 1981) encourages enhancement of public recreational opportunities and the development of visitor-serving facilities in its coastal zone, as long as it "preserves the unique qualities of Marin's coast and … is consistent with the protection of natural resources and agriculture." Generally, low-intensity recreational uses such as hiking, camping, and fishing are favored over high-intensity uses (Marin County Comprehensive Planning Department 1981). The LCP (Marin County Comprehensive Planning Department 1981) also directs federal parks to provide additional coastal access trails and bike paths "where feasible and where consistent with the protection of the parks' natural resources." Specifically, the LCP (Marin County Comprehensive Planning Department 1981) expressed support for the East/West Greenway along the railroad-right-of-way and the concept of bike and pedestrian trail network in the West Marin area, with potentially the most likely area being State Route 1 and Sir Francis Drake Boulevard. The Community Plan (2000) also supports efforts to identify appropriate locations for paths that could be used for both bicycle commuting and recreation, including investigations into the feasibility of using the abandoned railroad right-of-way.

However, while facilitating public use, enjoyment, and appreciation of bayfront lands, projects should "avoid or minimize disturbance to wetlands, necessary buffer areas, and associated important wildlife habitat" (Marin County Comprehensive Planning Department 1981). Both the LCP (Marin County Comprehensive Planning Department 1981) and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) have established policies against development of the Point Reyes Mesa bluff area above the railroad-right-of-way in the Giacomini Ranch East Pasture through setbacks.

In 2001, the County of Marin issued the *Marin County Unincorporated Area Bicycle and Pedestrian Master Plan.* This document contains analysis; goals, objectives and policies; a proposed system and improvements plan; and specific projects (LandPeople 2005). Among the projects is a recommended series of improvements in the Point Reyes and Inverness Area, including a potential bike/pedestrian path from the Point Reyes Station to Inverness (LandPeople 2005). The Plan also recommends the use of railroad right-of-way, where feasible, to complete the recommended routes (LandPeople 2005). The draft Marin CWP also shows a proposed trail along Levee Road and Sir Francis Drake Boulevard the entire distance to Inverness, but the map does not specify the type of trail (LandPeople 2005).

Both the Architectural Barriers Act of 1968 (PL90-480) and the Americans with Disabilities Act (ADA) of 1990 (PL 101-336) help to ensure that buildings and other facilities meet set standards to make them accessible to all visitors, including those with disabilities. The Park Service complies with ADA standards and follows the stricter of either the Americans with Disabilities Act Accessibility Guidelines (ADAAG; 36 CFR part 1191) developed in 1991 or the Uniform Federal Accessibility Standards (UFAS) established in 1984. Standards for outdoor recreational facilities are often guided by recommendations from a report issued in September 1999 by a Regulatory Negotiation Committee convened by the Architectural and Transportation Barriers Compliance Board (Access Board) to help guide development of guidelines for facilities such as trails, boating and fishing facilities, parks, and sports facilities. Based on these guidance documents, the Park Service requires that walks or paths that connect to accessible features need to be made accessible and that key features in the park need to be made accessible. However, paths need to be kept consistent with preserving the natural and cultural resources of the park, if the same experience can be provided on some portion of the alignment or a different trail. California has also developed handicap access standards through California Building Code, Title 24 regulations, although the Title 24 standards are intended for urban facilities and not necessarily rural and park-type trails.

Public Access Opportunities within the Project Area and Vicinity

Background

For comparison purposes, semi-quantitative ranking systems were developed as part of this document for characterizing visitation and the number of public access structures, facilities, and uses.

The number of structures, facilities, and uses within a 0.5-mile radius of trailheads or destination areas (e.g., Drake's Beach) is ranked as low, moderate, and high based on a relative comparison with the number of

structures, facilities, and uses present in other areas of the Seashore and north district of the GGNRA. Structure, facilities, and uses include not only constructed buildings and facilities (e.g., visitor centers, bathrooms, bridges, stairs), but amenities such as telephones and water fountains and attractions or permitted uses such as birdwatching, fishing, horseback riding, backpacking trailhead, and connections to other trails, etc.. The Seashore's Roads and Trails Division was consulted on the number of facilities, structures, and uses for other trailheads or destination points in the Seashore and north district of the GGNRA. Because this system is intended to be only a semi-quantitative tool for assessing effects of the proposed project, each facility, structure, and attraction or use was simply counted as one, regardless of the size of facility or relative degree of "draw" that certain facilities structures, and attractions or uses might have. Facility, structure, and use ranking consisted of low (between 1 and 5 structures, facilities, and uses), medium (between 6 and 10), and high (> 10). The Bear Valley Visitor Center area ranked as having the highest number of structures, faculties, and uses with approximately 25.

Although formal data on use of these structures and facilities do not exist, for the purposes of this document, use of facilities, structures, and uses semi-quantitatively estimated as very low (average of < 50 people per day), low (average of ≥ 50 and <125 visitors per day), medium (average of ≥125 and <450 people per day), and high (average of ≥450 people per day). These criteria were developed based on a relative comparison of daily numbers of people using other structures, facilities, and uses in the Seashore and north district of the GGNRA. Information used to develop criteria on public access, structures, and facilities and/or visitation came from analysis of aerial imagery, consultation with the Seashore's Roads and Trails division, published information, and data from the Interpretative and Law Enforcement Divisions. Data from the Interpretative Division includes estimated number of visitors based on road traffic counts and multipliers for average number of people per car.

Public Access Resources

Existing Trails, Users, and Maintenance

Because the Giacomini Ranch has been privately owned until recently, the only formal trails within the Project Area are those on lands owned by the Seashore and GGNRA and lands managed by the County of Marin Parks and Open Space District (Figure 38). However, several informal trails have been developed along portions of the Giacomini Ranch's levees. The Project Area and immediate vicinity currently incorporates approximately five (5) formal or informal trails or trail segments. A description of these formal and informal trails is provided below.

The number of structures, facilities, and uses of formal and informal trails in the Project Area ranged from low (between 1 and 5) to medium (between 6 and 10), with White House Pool County Park and the Giacomini Ranch West Pasture characterized as medium. All of the existing trails in the Project Area would be characterized as having very low visitation (average of <50 people per day) relative to trails such as Bear Valley, including Tomales Bay Trail, Olema Marsh Trail, Giacomini Ranch West Pasture, Giacomini Ranch East Pasture, White House Pool County Park, and Green Bridge County Park (E. Hulme, superintendent, Marin County Open Space and Park District, *pers. comm*.).

To the north of the Giacomini Ranch, Tomales Bay Trail, which is on GGNRA lands that are leased by the Martinelli family for beef cattle grazing, starts at a moderate-sized parking lot on State Route 1 on the eastern side of Tomales Bay and winds approximately 1.37 miles on a fire road trail through grassy hills to a vista point that overlooks the southern portion of the Bay (Figure 38). This designated hiking and biking spur trail ends at the base of Railroad Point, just north of where Tomasini Creek flows out into Tomales Bay. Visitor amenities are minimal along this trail and restricted to maintenance of the fire road and signage at the start of the trail, so public access structures, facilities, and uses would be characterized as low. The trail is not ADA accessible, and dogs are not allowed. Use of this trail would be estimated as very low compared to heavily used trails such as Bear Valley, although there are no formal use estimates.

South of Giacomini Ranch, the County has leased two areas from the state of California Wildlife Conservation Board that are maintained as parks. The largest of these is the County's White House Pool park located at the intersection of Sir Francis Drake Boulevard and Bear Valley Road (Figure 38). An approximately 0.5-mile unpaved dirt path starts on the northern side of Levee Road near the northeastern corner of Olema Marsh and winds through dense riparian habitat and open ruderal grassland areas adjacent to Lagunitas Creek before it ends at White House Pool. Two small wooden bridges cross the former and current outlets for Bear Valley Creek. A large paved parking lot (discussed below) occurs at the western end of the park and provides some

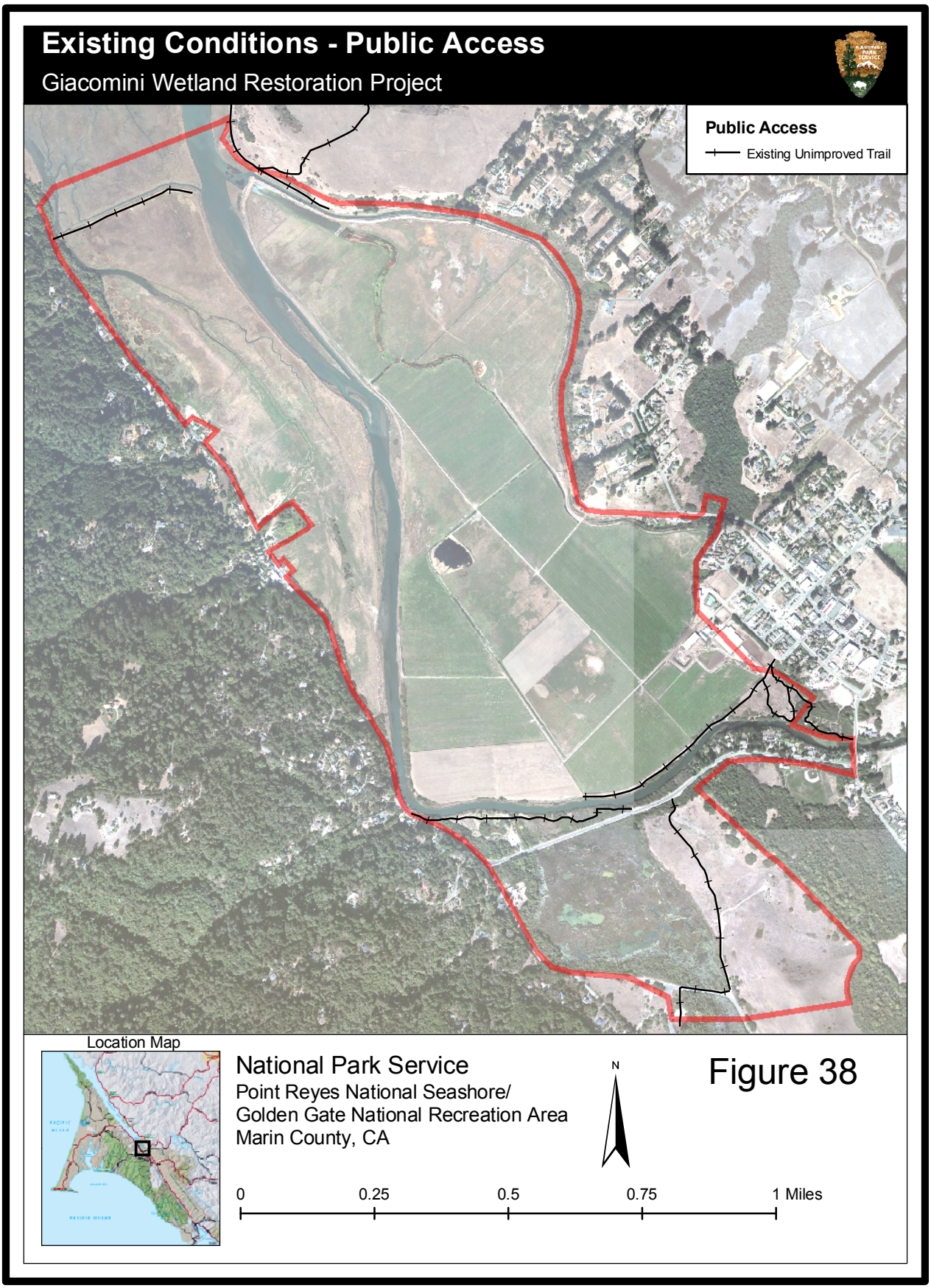

Existing Conditions - Public Access
Giacomini Wetland Restoration Project
Public Access
Existing Unimproved Trail
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 38

access for water-based recreation such as kayaking. With the exception of the parking lot, visitor amenities are relatively simple and restricted to a portable toilet and small benches that have been placed along the creek. However, because of the accessibility to people with bikes, horses, boats, and dogs, the number of structures, facilities and uses of this trail ultimately ranked as high. Use of this trail is very low relative to the Bear Valley Trail with annual visitation of this and the Green Bridge County Park trails estimated at 7,000 people (E. Hulme, superintendent, Marin County Open Space and Park District, *pers. comm*.) and includes primarily people walking dogs, bicyclists, and birdwatchers. The County does limited maintenance on the trail and viewing areas along the trail annually, as well as regularly servicing the portable restroom in the parking lot. The trail is not ADA accessible.

The eastern end of the White House Pool County Park trail is directly opposite the Olema Marsh trail, which runs approximately 0.39 mile along the eastern edge of Olema Marsh through grassland directly adjacent to the shutter ridge created by the San Andreas Fault (Figure 38). Use of this trail would be characterized as very low compared to heavily used trails such as Bear Valley, despite the fact that it offers a moderate or medium number of attractions and features (facility, structure, and uses between 6 and 10). Most visitors come to this area for birdwatching and access it from the southern end, which includes an access road and a small unpaved parking lot. This trail has the potential to link the White House Pool County Park trail with the Limantour Trail that parallels Bear Valley Creek and thereby potentially connect with the Bear Valley Trail near the Bear Valley Visitor's Center. Use of this trail linkage would currently require crossing of several busy roads that do not have pedestrian crosswalks. The trail is not ADA accessible.

Between the Green Bridge and Giacomini Ranch dairy facility is a small, approximately 10-acre parcel dominated by seasonal wetland/grassland and riparian scrub-shrub (Figure 38). Several dirt paths totaling approximately 0.5 miles criss-cross the park, with the main entrance and exit points being the Giacomini Ranch driveway at 3rd and C Streets in Point Reyes Station and the southeastern side of the Green Bridge. Amenities are extremely minimal in this park, with structures, facilities, and uses ranked as low (between 1 and 5). The trail is not ADA accessible. While visitor use of this trail system would be characterized as very low compared to Bear Valley Trail, a fair number of people use this system, largely because it connects to one of the informal paths that has been created on the Giacomini Ranch's southern levee, and the trail allows dogs on leash, as do most other County parks. The County does limited maintenance on the trail annually.

For many years, the public has accessed the Giacomini property along an approximately 0.32-mile informal dirt path on the elevated creek bank and levee (Figure 38). This spur trail ends at approximately the location of the Giacomini's old summer dam and largely has views of Lagunitas Creek, some patches of riparian habitat, the Giacomini Ranch's East Pasture, and the White House Pool County Park. Use of this trail would be characterized as very low compared to heavily used trails such as Bear Valley, although there are no formal use estimates. Most of the users are members of the local community who walk their dogs, bird watch, or even do some painting, most of whom access the trail from 3rd and C Street in Point Reyes Station. While the Park Service restricts dog walking to certain areas of the Seashore and the GGNRA and requires dogs to be on a 6-foot leash at all times (36CFR 2.15 (a) 2), leash laws have not been enforced within the Giacomini Ranch, because this area is not under formal Park Service management currently. Because of this path's informal nature, there are no visitor amenities, and there is no connection with the White House Pool County Park. Facilities, structures, and uses would be characterized as low (between 1 and 5). It is unclear whether the Giacominis maintain this area or whether it is maintained through use, but there is no formal maintenance. The trail is not ADA accessible.

The other informal trail in the Project Area is at the northwestern corner of the Giacomini Ranch along the top of the levee at the northern end of the West Pasture (northwestern levee; Figure 38). It can be accessed from a small pull-out area on the east shoulder of Sir Francis Drake Boulevard north of Drake's View Drive. This approximately 0.28-mile dirt spur trail leads from Sir Francis Drake Boulevard to the northeastern corner of the West Pasture at Lagunitas Creek. This trail does not receive as much use as the informal path near Point Reyes Station, however, there are occasional hikers and dog walkers, as well as hunters who access State Lands Commission areas north of the Giacomini Ranch via this levee. Other than parking, amenities are minimal, but structures, facilities, and uses ranked as medium (between 6 and 10), because of the viewing, birdwatching, and other features available. The trail is not ADA accessible. The trail generally receives few or very low number of visitors. Highest visitation for this trail occurs in the winter, when literally hundreds of birders from San Francisco Bay and other areas crowd onto the levees to view California black rails that move from the adjacent undiked marsh during extreme high tides in December, January, and February into higher elevations areas such as the levees. During the weekends, more than 50 vehicles are often parked haphazardly some distance along the narrow shoulder of Sir Francis Drake Boulevard. Because of the potential disturbance to these special status

species, in 2005, the Seashore requested that birdwatchers restrict trail use to the western end of the trail to decrease proximity to rails seeking high-tide refuge.

Parking

Parking issues are addressed under Transportation, but, because parking affects visitor and resident experience in terms of ease accessing trails, information from the Transportation section is summarized here. Two formal parking lots serve trails in the Project Area and vicinity. There is a parking lot with 14 parking spaces at the trailhead for Tomales Bay Trail that generally has high capacity (i.e., occupancy does not exceed 90 percent of capacity during weekday and weekend regardless of season) and another parking lot with approximately 43 parking spaces at White House Pool County Park that has medium capacity (i.e., occupancy does not exceed 90 percent of capacity during weekdays and most weekends except for some holiday and high season period weekends). Approximately 23 informal parking areas exist for the Giacomini Ranch West Pasture in pullout areas along the side of Sir Francis Drake Boulevard, although parking often overflows onto the street during the winter high tide periods. There are no designated formal or informal parking areas for the Giacomini Ranch East Pasture and Green Bridge County Park trail network, with most people parking alongside homes on 3rd and C Street in Point Reyes Station or walking to the trail from other parts of town. Parking can be difficult on busy weekends and weekdays.

Safety Issues

One of the foremost concerns that pedestrians and cyclists have about public access is safety (Alta Transportation Consulting 2001). While many bicyclists believe that the vast majority of bicycle crashes involve collisions with automobiles, in actuality, studies of hospital data have shown that most actually result from falls or collisions with stationary objects, other cyclists, or pedestrians (Alta Transportation Consulting 2001).

Relative to adjacent counties such as Sonoma and the state as a whole, Marin County has a low fatality rate for pedestrian accidents. Between 1995-2005, the pedestrian fatality rate for Marin County averaged approximately 0.79 fatalities per 100,000 population, compared to 1.6 fatalities per 100,000 population in Sonoma County and 2.2 for California as a whole (National Highway and Transportation Safety Analysis NHTSA 2007). In reviewing data from April 1996 to April 1999 for preparation of the Marin County Unincorporated Bicycle and Pedestrian Master Plan (February 2001), Alta Transportation Consulting found that approximately 100 serious accidents occurred per year during that study period (Alta Transportation Consulting 2001). Sir Francis Drake Boulevard ranked highly, with a total of 26 crashes (Alta Transportation Consulting 2001). Unincorporated areas of Marin County tied with Novato for having the second highest rate of pedestrian crash accidents behind San Rafael at 27 percent (Alta Transportation Consulting 2001).

NHTSA did not report rates of fatal bicycle accidents for individual California counties, but California as a whole had a rate of 3.06 per million people (NHTSA 2004b). Marin County statistics for serious bicycle accidents were somewhat similar for pedestrian accidents. Alta Transportation Consulting found that approximately 170 bicycle-motor vehicle crashes per year were reported between 1996 and 1999 in Marin County. Compared to other communities in California, the number of incidents per 1,000 people in Marin County (0.69 incidents per 1,000 persons) is similar to that of the national average of 0.67 incidents per 1,000 persons (Alta Transportation Consulting 2001).

Of those, approximately 39 occurred in unincorporated regions of the county (Alta Transportation Consulting 2001). Roads that had multiple crashes during this period included Sir Francis Drake Boulevard (21 crashes; section not specified) and State Route 1 in unincorporated County (14 crashes; Alta Transportation Consulting): these rates were among some of the highest reported for particular roads, although both of these roads are extremely long and span almost the entire county, stretching from east to west and north to south, respectively. A comparison with data provided by the California Highway Patrol (CHP) showed that, between 1990-2005, 11 bicycle and 1 pedestrian accident occurred on Point Reyes-Petaluma Road between the Marin-Sonoma County line and State Route 1 and 15 bicycle and 3 pedestrian accidents occurred on Sir Francis Drake Boulevard between White's Hill in Fairfax and State Route 1 (Officer Ingles, CHP, *pers. comm*.). The unincorporated area of Marin accounted for approximately 18 percent of Marin County bicycle accidents between 1996 and 1999, the second highest behind San Rafael at 40 percent and Novato at 15 percent (Alta Transportation Consulting 2001).

Visitor and Resident Experience – Visual Resources and Viewsheds

Background and Regulatory and Policy Setting

The Park Service Organic Act of 1916 states that the Park Service "…shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations…by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the **scenery** and the natural and historic objects and the wildlife therein…" Park Service Management Policies (2006) describe the "park resources and values" that are subject to the Park Service no-impairment standard (NPS 2006; Section 1.4.6). Included among these are a park's "scenery, scenic features, natural visibility, both in daytime and at night, and natural landscapes." Park Service management policies characterize scenic views as highly valued characteristics of the natural resources, processes, systems, and values found in national parks. Scenery is not limited to features, but relates to light and shadows, as well. Parks are directed to "…preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light" (NPS 2006, Section 4.10).

Viewsheds are often experienced from automobiles, which has resulted in designation of scenic highways in California. The entire segment of State Route 1 in Marin County is an eligible state scenic highway under the CalTrans Scenic Highway Program. The *Guidelines for the Official Designation of Scenic Highways* (CalTrans 1996) states that the scenic corridors (defined as the area of land generally adjacent to and visible from the highway) of officially designated state scenic highways are subject to protection, including regulation of land use, site planning, advertising, earthmoving, landscaping, and design and appearance of structures and equipment. Within the Coastal Zone, which incorporates the Project Area, the LCP (Marin County Comprehensive Planning Department 1981) specifically identifies Sir Francis Drake Boulevard as providing a scenic driving experience for coastal visitors and an important access road for local residents. The LCP (Marin County Comprehensive Planning Department 1981) notes that, "in order to protect its scenic rural character, the road shall be maintained as a two-lane roadway."

Viewsheds are often experienced from automobiles, which has resulted in designation of scenic highways in California

The LCP for Zone II (Marin County Comprehensive Planning Department 1981) refers to visual resource protection policies in the Coastal Act that address the importance of protection of views to scenic resources from public roads, beaches, trails, and vista points. The *Marin Countywide Plan* (draft Countywide Plan 2005) mandates that visual and aesthetic resources, especially scenic vistas, shall be protected by review of planned projects and removal of inconsistent existing elements. The County has developed two policies to protect visual and aesthetic resources. The Viewshed Protection policy protects visual access to the bay front and scenic vistas of water and distinct shorelines through its land use and development review procedures. The View Corridor and Enhancement Policy urges that existing built elements, such as overhead utilities, which detract from the shoreline and marsh landscape, should be eliminated or blended into the environment.

Visual Resources and Viewsheds in the Project Area and Immediate Vicinity

Background

The analysis of viewshed or visual resources was guided by two widely-accepted protocols used for evaluating visual impacts of proposed projects: the Federal Highway Administration (FHWA) technical document *Visual Impact Assessment for Highway Projects* (Federal Highway Administration 1983) and the US Forest Service (USFS) *Landscape Aesthetics: A Handbook for Scenery Management* (USDA 1995). These protocols, together with guidance from Park Service Management Policies (2001) on protecting dark night sky resources, form the

basis of an objective methodology used to establish the visual characteristics and quality of landscapes and to assess impacts on scenic vistas and scenic resources.

The analysis was based on the premise that people value most highly the more scenic landscapes, that natural or natural-appearing landscapes are generally the most valued, and that people also value cultural enclaves of structures (fences, historic structures) as sub-dominant visual themes nested within larger natural-appearing landscapes (USDA 1995). While this is generally true, in Marin County, pastoral landscapes, as well as natural landscapes, are valued, as well, with the county and the public making efforts to retain an agricultural way of life in west Marin and the scenic values this way of life provides. Pastoral landscapes include predominantly agricultural lands with grazing by livestock, however, other forms of agricultural also have scenic value to people such as vineyards. In addition to composition and structures, other valued characteristics of landscape include diversity of form, line, color, and texture; long sweeping vistas; and natural lightscapes (FHWA 1983, NPS 2001).

Eight viewpoints and view corridors were chosen to represent the visual resources of the Project Area for this analysis (Figure 39). These views were chosen subjectively as those locations from which most visitors would visually experience the Project Area. They were also chosen to represent the range of views of the Project Area which are available from within the site and from the surrounding community. For each of these views, the present landscape character was described according to principles defined in FHWA (1983) and USDA (1995) and incorporated natural lightscape characteristics, as required by Park Service Management Policies. Baseline conditions were then compared to projected changes to the views under all project alternatives. In the analysis, potential changes to the following landscape elements were evaluated:

- *Integrity:*

  Scenic integrity is defined in *Landscape Aesthetics: A Handbook for Scenery Management* (USDA 1995) as:

- *The degree of direct human-caused deviation in the landscape by management such as earth moving, road construction, or resource extraction:* This element is evaluated by measuring the degree of alteration in line, form, color, and texture from the natural or natural-appearing landscape character, or from the established landscape character accepted over time by the general public. This is done by measuring changes in scale, intensity, and pattern against the attributes of that landscape character.

  Views with high scenic integrity also have a sense of wholeness or intactness, with no discordant elements.

- *Diversity:*

  Diversity in landscape is characterized by variety in form, line, color, and texture components visible in a landscape view. Diversity is also characterized by high variety in these components within the foreground view (up to 0.25 miles from the observer), mid-ground view (between 0.25 and 1 mile from the observer), and background view (more than 1 mile from the observer) of the view; and also variety between these views. In general, mid-ground views are subjected to the most visual scrutiny by observers.

- *Prospect:*

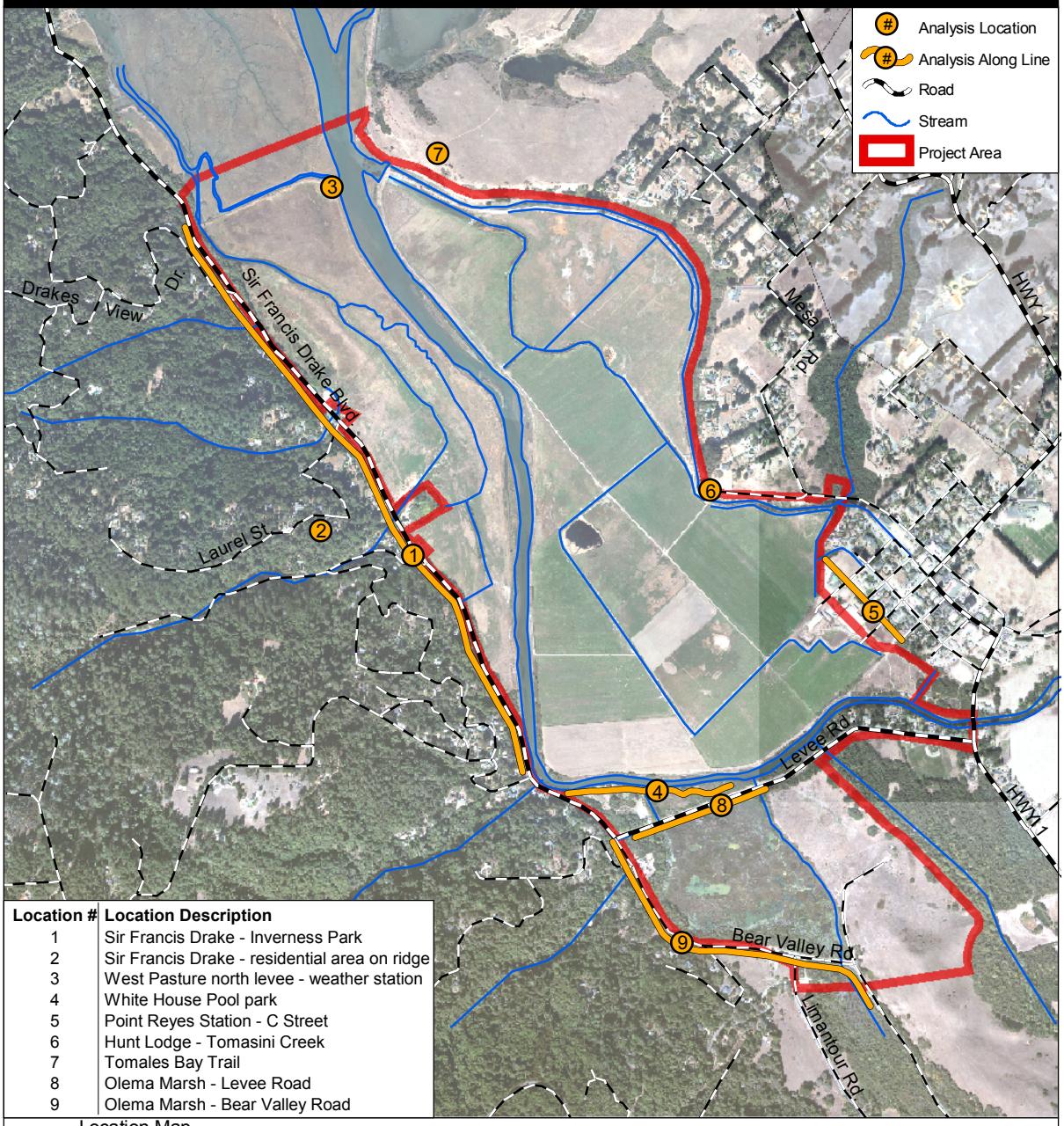
  Scenic values increase as the terrain allows longer views. Prospect describes the length of view from the viewpoint or view corridor.

- *Natural Lightscapes:*

  Scenic values are highest in landscapes dominated by natural lighting regimes. After sundown these landscapes are lit predominantly by star- and moonlight. In scenes with natural lightscapes light pollution from nearby communities and distant metropolises is minimized.

Viewshed Analysis Locations

Giacomini Wetland Restoration Project



Location #	Location Description
1	Sir Francis Drake - Inverness Park
2	Sir Francis Drake - residential area on ridge
3	West Pasture north levee - weather station
4	White House Pool park
5	Point Reyes Station - C Street
6	Hunt Lodge - Tomasini Creek
7	Tomales Bay Trail
8	Olema Marsh - Levee Road
9	Olema Marsh - Bear Valley Road

Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

0 0.25 0.5 0.75 1
Miles

N

Figure 39

Visual Resources in Project Area – General Description

In addition to active recreational opportunities such hiking, biking, walking dogs, horseback riding, and kayaking, visitors and residents of local communities can experience the beauty of national parks and undeveloped areas through viewsheds or opportunities to view aesthetically pleasing vistas within the watershed, whether that be the waters of Tomales Bay, grazing cows in a field, or a herd of tule elk on Tomales Point.

The major visual resource landforms in the Project Area and immediate vicinity are the rift zone valley along the San Andreas Fault (valley bottom), the Point Reyes Mesa coastal marine terrace bordering the Giacomini Ranch to the east (terrace), the granitic-dominated Inverness Ridge on the west (ridge), and the grassy shutter ridge hills that separate Bear Valley Creek from Olema Creek (hills). For the purposes of evaluating existing viewshed resources, visual quality was assessed at nine viewpoints in the Project Area and immediate vicinity. Viewsheds in the Project Area include both low-elevation viewpoints along roads and trails, as well as higher elevation ones on the Point Reyes Mesa and Inverness Ridge, which include many rural residential developments. Because of the steepness of the Inverness Ridge and even Point Reyes Mesa, background visual resources, which include features more than 3 miles from the viewpoint, are often not visible, except in certain directions (e.g., north along the rift zone valley) or from elevated viewpoints on the Inverness Ridge or Point Reyes Mesa.

Viewshed resources are experienced somewhat differently by visitors and residents even at the same viewpoint depending whether they are stationary or moving. As the LCP noted, Sir Francis Drake, which closely follows the edge of Tomales Bay, offers numerous viewsheds or viewpoints, although the experience probably differs slightly depending on whether visitors and residents are driving, bicycling, walking, or standing still. Motorists can catch glimpses of the southern and northern portions of Olema Marsh on Bear Valley Road and Levee Road, respectively, and of the western portion of the Giacomini Ranch along portions of Sir Francis Drake Boulevard. Viewing opportunities along Sir Francis Drake Boulevard primarily consist of pastures and, when present, grazing cattle: the levee obscures views of Lagunitas Creek. Groundwater and small creeks along the base of the Inverness Ridge have promoted growth of stands of riparian scrub-shrub and forest (see Vegetation Resources) that obscure portions of the pasture from vehicular, pedestrian, and cyclist passers-by on Sir Francis Drake Boulevard. The viewshed of some of the residents of Inverness Park is also minimized by the riparian habitat, primarily those along Sir Francis Drake Boulevard. Most of the residents, however, live on the hillside, above the treeline. Viewpoints near Olema Marsh from Bear Valley and Levee Roads, most often seen from a moving car, primarily offer views of marshlands, riparian forest, grassy hills along the shutter ridge, and the forested Inverness Ridge. Most of the residential development on the Inverness Ridge in the Silver Hills is remarkably hidden from view by the tall conifers that dominate much of the ridge.

Some viewpoints can only be accessed on foot. The elevated vista point near the end of Tomales Bay Trail offers spectacular views of southern Tomales Bay, Lagunitas Creek, undiked marshlands, the forested Inverness Ridge, and, depending on the exact viewpoint, some views of the heavily vegetated Point Reyes Mesa bluff. The lower elevation White House Pool County Park trail and the two Giacomini Ranch informal paths offer more constrained views of Lagunitas Creek, pastoral areas with cows, riparian habitat, the forested Inverness Ridge, the heavily vegetated Point Reyes Mesa bluff, and/or undiked marshlands. Visual quality of these areas is negatively affected to some degree by unsightly infrastructure or encroachments associated with agricultural development such as levees, riprap, pipelines, power poles, and deteriorating barns, although the dairy cows and pasturelands themselves, which remain green almost all year long, can be perceived as a benefit to visual quality as they provide highly valued pastoral scenery.

On the eastern side of the Giacomini Ranch, viewshed opportunities are constrained by natural topography and land use and ownership, as most of the East Pasture's perimeter is privately owned or leased by the Giacominis from the Park Service. As with Inverness Park, residents of Point Reyes Station live on an elevated mesa or terrace that maintains a viewshed despite the fact that willows are present and have even expanded in areal extent. The elevation of the terrace in this area allows panoramic views of southern Tomales Bay and the entire Giacomini Ranch, similar to that offered by the Tomales Bay Trail. Several isolated stands of very tall eucalyptus growing on the Point Reyes Mesa slope on private lands probably do block views of Tomales Bay in some areas. Views from the town of Point Reyes Station are reduced to some degree by the presence of the dairy facility buildings, barns, and the row of cypress trees, all of which are quite tall. Views from town primarily consist of pastures, grazing cattle, and the heavily forested Inverness

Ridge. Growth and expansion of willow along the eastern edge of the Green Bridge County Park has apparently negatively affected views for some of the residents near 3rd and C Streets in Point Reyes Station, whose homes are on a lower portion of the mesa than those to the north.

Visual Resources in Project Area – Specific Descriptions from Viewpoints

Sir Francis Drake Boulevard, Inverness Park: Along Sir Francis Drake Boulevard bordering the West Pasture the foreground view is dominated by tall (average = 20 foot) riparian trees such as willow and alder sustained by groundwater that seeps from the toe of the Inverness Ridge and sheetflows across the West Pasture. Between these clumped stands of riparian trees, travelers may observe longer views across the West Pasture. In the mid-ground, these views are dominated by short, grazed annual grasses that are green in the winter and golden-yellow in summer on the flat pasture and that are broken occasionally by sparse stands of open-leaved willow trees growing in linear ditches and old slough channels. Behind the pasture, the rise of the West Pasture levee is visible, and beyond that the rough, green vegetation on the slopes of the Point Reyes Mesa. At the northernmost reach of this view corridor, the longer views are obstructed by the tall (~9 foot), green stalks of cattails in the freshwater marsh bordering Sir Francis Drake Boulevard. At several locations along the roadway, views of the Project Area are interrupted by small homesteads consisting of single-story wood frame houses and out buildings, vehicles and farm equipment, fencing, and small ranch operations. From many vantage points along the road, the bright silver form of the loafing barn is visible in the far distance beyond the Lagunitas Creek levees. At the far southern reach of this view corridor, the scene is dominated by the broad blue/brown band of Lagunitas Creek and its abundant green riparian vegetation, rounding a 90-degree bend at White House Pool. At night, the lightscape from this view corridor is dominated by lighting from the town of Inverness Park, residences bordering the Project Area, and a horizontal band of sparse dim lights from the visually-distant Point Reyes Mesa residences.

Inverness Ridge above Inverness Park: From residential roads on Inverness Ridge above Inverness Park, observers, including residents, can obtain an expansive view of the Project Area. The **foreground** of these views is typically dominated by conifer forest trees lining the roadways. **Mid-ground** views consist of tree tops and roofs of single-family homes. The **background** views, however, are dominated by the East and West Pastures within the Project Area. One of the primary elements of this view is the blue undulating form of Lagunitas Creek winding north through the Project Area, bordered by thin, bright green bands of tall wetland vegetation. The levees bounding the creek are visible at this vantage, distinguished from the lower marsh plain by their brighter gold color in summer, breaking the pastures into geometric forms. Black and white cows graze and rest in the pastures. The vegetation in pastures in late summer is variegated gold and dull green, broken by linear bands of darker green riparian vegetation persisting in ditches and old slough channels. During the winter, when the pastures are more uniformly green, the islands of riparian vegetation are distinguished primarily by their height and apparent roughness. Beyond the pastures, to the east, the roofs and rough, dark green vegetation of the Point Reyes Mesa forms a contrasting horizontal band of color and texture. The view to the south affords vistas of the East Pasture, including grazing cows, green irrigated grasslands, and streaks of brown fencing and silver-colored irrigation piping. Behind the East Pasture observers can see the silvery geometric form of the loafing barn in the East Pasture and the brown, unvegetated fenced cattle lots, and the structures of Point Reyes Station behind them. Looking to the north, observers can note the linear feature of the West Pasture north levee bounding the end of the West Pasture and marking the transition from pasture to the Natural Landscape characterized by green undiked salt marsh and blue Tomales Bay to the north. The forested Inverness Ridge to the west, and grassy rounded hills to the east, slope down to meet the marsh and the bay. At night, the lightscape approximates natural lighting, broken only by the sparse dim line of visually-distant lights from Point Reyes Mesa residences~~,~~ and from cars moving along Sir Francis Drake Boulevard.

West Pasture North Levee: The immediate **foreground** is dominated by the highly-artificial structure of the 20-foot tall weather station and the wire fence surrounding this equipment. Looking south from the eastern tip of the levee, into the Project Area, the foreground of the view is scored by the broad dark blue line of Lagunitas Creek bounded within its levees. The levees themselves are set back from the creek by a 10-foot band of low-texture herbaceous vegetation~~,~~ and rise about 8 feet above the marsh plain. The levees are dominated by a Ruderal Landscape characterized by a texturally-complex annual exotic herbaceous plants, mostly gold-colored by late summer. Behind the levee, looking toward the East and West Pastures, the **mid-ground** view is of short-grazed annual grasses, gold-colored in summer and broken up in places by green patches of taller perennial shrubs along linear features such as ditches and old slough channels. The West Pasture is bordered to the west by the tall green cattails of the freshwater marsh. Behind the freshwater marsh, in the **background** of the view, automobiles on Sir Francis Drake Boulevard are occasionally seen and

heard, and houses on the lower elevations of the dark-green forested Inverness Ridge are visible. Looking toward the East Pasture, a dominant feature of the mid-ground view is the 10-foot tall highly-geometric form of the Tomasini Creek tide gate controlling the outflow of Tomasini Creek water into Lagunitas Creek and the levees that preclude views of the East Pasture. Further down the East Pasture levee, to the south, the small, wooden, pitch-roofed pumphouse for the East Pasture irrigation system is visible, as are the wooden power poles delivering electricity to the pumps. These, combined with the levees, disrupt the integrity and unity of the Pastoral Landscape. In the background, residences on the Point Reyes Mesa, which are about 30- to 50 feet above the level of the marsh plain, are visible between and behind tall green stands of eucalyptus trees. The silvery, geometric form of the loafing barn, in the far southern end of the Project Area is partially visible in the distance. After sundown, this view is highly characteristic of a rural lightscape: sparsely distributed residential lights on the slopes of the Inverness ridge, headlights of cars moving along Sir Francis Drake Boulevard, and the dim visually-distant lights of Point Reyes Station and the Point Reyes Mesa are the only intrusions into the natural darkness.

White House Pool County Park: This view corridor along the single-lane dirt trail paralleling Lagunitas Creek, accessed from the White House Pool County Park parking area, is dominated in the **foreground** by the broad blue channel of the creek and its associated bright-green riparian vegetation. In the **mid-ground** view, the southern portion of the East Pasture levee rises up about three feet above the level of the marsh plain, visually separating the creek from the southern portion of the East Pasture. The levee is dominated by tall, rough, flowering weedy vegetation, intermittently broken by low hedges of dark green blackberry bushes and tall solitary stands of round-profiled gray-green willow trees. A post-and-wire fence runs along the top of the levee, contributing to the pastoral quality of the view. Behind the levee, elevated silvery irrigation piping is clearly visible, somewhat disrupting the integrity and unity of the Pastoral Landscape characterized otherwise by green pasturelands dotted sparsely with black and white cows. The expanse of green fields in the East Pasture in the **background** is broken up by levees, ditches, roads, wooden power line supports, and fences running parallel and perpendicular to each other. Looking to the east, viewers can observe the strongly-pitched roof and metallic siding of the large loafing barn and its skirt of unvegetated brown cattle yards. To the northeast, the rough, dark green undifferentiated vegetation of the Point Reyes Mesa is punctuated with glimpses of private residences and stands of tall linear eucalyptus trees. Behind the Point Reyes Mesa, the smooth grassy rounded form of Black Mountain dominates the horizon, sloping northward down to other grassy, rounded ridges and the green-and-golden bluffs of Millerton Point. To the northwest, observers can view the heavily forested Inverness Ridge paralleling the Project Area northward, with occasional outcroppings of single family houses on lower slopes. The northwest prospect includes views of residential development and power lines following Sir Francis Drake Boulevard to the north. After sundown, the lightscape at this location is altered only by the thin band of lights of the residences on the Point Reyes Mesa, and the dim collection of lights from the residences on the slopes and toe of the Inverness Ridge.

Point Reyes Station C Street: From C Street looking westward towards the Project Area, the immediate **foreground** of the view is largely dominated by ranching activities associated with the Giacomini Dairy. At the northernmost portion of this view corridor, views of the dairy operations, including the loafing barn and wood-frame houses and out buildings, are obscured by a 25-foot-tall stand of rough-textured, dark green Monterey Cypress trees. At the southern reach of this view corridor, pale wooden fences and rough-churned expanses of the dairy's enclosed cattle yards front C Street. Beyond the cattle yards, the scene encompasses several tall, rounded peaks of stores of materials, including manure and sawdust, and the open, dark interior of the aluminum-sided loafing barn. Looking to the south, viewers can observe rough, dark green, shrubby vegetation on the southern portion of the East Pasture levee and the linear feature of the levee itself confining Lagunitas Creek to its broad blue channel. Beyond the operations yards in the **mid-ground** vista, viewers can observe the green short-grazed irrigated fields or Pastoral Landscape of the East Pasture. These fields are predominantly smooth-textured, but are broken by occasional patches of taller, rough-textured dark green vegetation, with black and white cows dotting the pasture. Wooden power poles elevate linear stretches of wire across the pasture, somewhat disrupting the integrity and unity of the Pastoral Landscape. Beyond the pasture in the **background** view, the rise of the levee stretching north along Lagunitas Creek is visible, backed by coniferous forest and the housing development at the toe and lower slopes of the Inverness Ridge. Occasional traffic on Sir Francis Drake Boulevard is visible. The lightscape at this location is altered from natural conditions, and is dominated by the nearby lights of Point Reyes Station, and the dim sprinkling of lights from the residences on the Inverness Ridge.

Hunt Lodge East Pasture: The **foreground** in front of the Hunt Lodge is dominated by the rough, dark-green cattails choking the channel of Tomasini Creek running northward parallel to the East Pasture. The long, red, wood-sided Hunt Lodge itself forms a prominent part of the view here, surrounded by boxy green hedges and tall Monterey Pine and eucalyptus trees. Beyond Tomasini Creek, the levee visually and

topographically separates the channel from the flat green plane of the East Pasture grasslands. The levee, which rises about 3- to 5 feet above the pasture, is topped by a Ruderal Landscape characterized by rough, patchy blanket of tall multi-colored weedy vegetation. The East Pasture beyond the levee, in the **mid-ground** of the view, is segmented into geometric forms by broad roads, post-and-wire fences, and silvery elevated irrigation piping. This piping, the Tomasini Creek levee, and infrastructure such as wooden power poles and electrical lines, fences, and the pitched-roof wooden pumphouse somewhat detract from the integrity and unity of visual resources in the Pastoral Landscape that is otherwise dominated by black and white cows in the fields. Beyond the pasture, the horizontal rise of the Lagunitas Creek levee is visible in the background, backdropped by the rough dark-green evergreen vegetation of the Inverness Ridge. In the background of this view, the Natural Landscapes of Inverness Ridge and the rounded grassy hills to the east converge to meet the undiked salt marsh and the bay. To the south, the dark green rough-vegetated slopes of the Point Reyes Mesa rise up above the Project Area, topped with a sparse settlement of residences and tall stands of eucalyptus trees. Beyond the Mesa to the south, the metallic aluminum siding of the loafing barn is highly visible at the south end of the East Pasture, ringed by fences and the barren grounds of cattle yards. The natural lightscape at this site is marred only by the dim residential lights from the Inverness Ridge.

Tomales Bay Trail: The vista from the Tomales Bay Trail encompasses nearly the entire Project Area. The predominant feature of the **mid-ground** view of the Project Area is the long, dark blue sweep of the Lagunitas Creek channel, running from the far southern reach of the site northward towards the bright blue basin of Tomales Bay. Looking to the south, the silvery pitched roof of the loafing barn protrudes a tiny bit into the irrigated green fields of the East Pasture, which are segmented and somewhat disrupted by linear fences, roads, ditches, and power poles. To the east of the pumphouse, the shallow channels of remnant slough features are visible, along with linear artificial-looking ditch features, bounded by the dark green slopes of the Point Reyes Mesa. The artificially constrained path of Tomasini Creek, leveed to run alongside the Point Reyes Mesa until it reaches the tidegate at its mouth to Lagunitas Creek, is also highly visible. Looking to the west beyond Lagunitas Creek, the rise of the roughly-vegetated levee, dominated by a Ruderal Landscape, visually separates the West Pasture from the rest of the Project Area. In the **background** view, the Ridge is the dominant feature of the west vista, paralleling the smooth fields of the Project Area~~,~~ and running north to meet Tomales Bay. From this vantage, occasional traffic is seen and heard on Sir Francis Drake Boulevard, and the houses dotting the hillside are unobtrusive.

Olema Marsh Bear Valley Road: The **foreground** of the view along Bear Valley Road is dominated by tall (~15 foot), dark green riparian forest vegetation, such as willow and alder trees. Between stands, observers can look west into Olema Marsh. Immediately visible from the road are bright green patches of mid-height wetland vegetation (~2 foot tall), such as bulrush and fern, backdropped by taller (~9 foot) cattail and patches of open water. In the **mid-ground** view the land slopes up to the grassy, golden Shutter Ridge, dominated by a somewhat Natural Landscape of ruderal and native grasses and forbs. Wooden power poles are visible in the far distance. To the north, the mid-ground view is dominated by a row of dark green willow trees bounding the marsh, and beyond that, the green Bolinas Ridge and golden, rounded Black Mountain comprise the **background** view.

Socioeconomic Resources

Marin County has a $500 million annual tourist industry. It is estimated that the Seashore contributes over $150 million to the regional economy visitor expenditures on dining, fuel, gifts, groceries, and lodging (NPS 2002). According to a visitor survey conducted by Sonoma State University (NPS 1997), 74 percent of the visitors to the park are traveling to the Seashore as their main destination; 50 percent of park visitors are staying between 2-6 hours in the park, with 30 percent staying overnight; and 40 percent of visitation comes from Marin, Sonoma, and San Francisco Counties, with 16.5 percent coming from outside of California.

The Seashore received 2.35 million visitors in 2000, accounting for 930 travel party days and nights in the area. An average visitor party spends $94 per party per night in the local area ($109 if locals excluded). Total visitor spending was $87 million in 2000 or $80 million excluding local visitors. This spending of visitors from outside the local region generates $69 million in sales by local tourism businesses, yielding $25.6 million in direct income and supporting 1,100 jobs. Each dollar of tourism spending yields another $0.63 in sales through the circulation of spending within the local economy. Including these secondary effects, the total economic impact of the park on the local economy is $113 million in sales, $42 million in wages and salaries, and 1,800 jobs (Michigan State University 2001).

Park Operations and Management Resources

Background

To fulfill its mission, the Park Service receives funding from both the federal appropriations process and other federal revenue sources. The Park Service requests direct Congressional funding and reports on the other federal revenue sources through an annual budget document submitted to Congress entitled "Budget Justifications," or more popularly called, the "Green Book." Like most federal agencies, the Park Service relies on federal appropriations to fund its core activities, although there is increasing use of alternative revenue sources such as fees and even private grants and mitigation monies to fund specific projects. In addition to base funding, certain parks receive monies from fees generated through park admissions, and parks can also apply for one-time funding through certain appropriation programs that cover cyclic maintenance, construction, etc. For example, the park recently received approximately $1.6 million in this one-time funding for cyclic maintenance on historic structures**{** XE "historic structures" **}** and other natural resources projects. As part of the San Francisco Bay Network, the Seashore benefits from monitoring information gathered as part of the $800,000 Inventory and Monitoring (I&M) Network. The park will also receive about $625,000 in fee revenues for other maintenance projects and operation of the whale shuttle system and campground reservation system. In addition, the park receives approximately $1,000,000 in FirePro and Wildland Interface funding for hazardous fuel reduction and fire prevention activities.

Because of the limited amount of base funding available to support the 389 park units, the Park Service directs its units to consider the effects of proposed projects on base funding, including any increases in operations and maintenance expenses.

The Seashore is one of the 30 most visited parks in the National Park system. It is estimated that the Seashore contributes over $150 million to the regional economy.

Park Operation and Management Resources

For FY2006, the Seashore has about 75 permanent staff, 10 term employees, and 25-30 temporary staff working on a variety of projects and programs, including Natural Resources, Cultural Resources, Science, Maintenance, Roads and Trails, Fire, Law Enforcement, and the Pacific Coast Learning Center. During the peak summer months, the park staff increases to about 150 staff members, including Youth Conservation Corps enrollees who provide assistance in a number of ways to Point Reyes National Seashore. This work force is supplemented by 20,000 hours of Volunteers-in-Parks service, three Student Conservation Assistants, and AmeriCorps.

The Seashore maintains the necessary infrastructure to support an annual park visitation of 2.25 million people, provide offices, support structures and limited housing for the permanent and seasonal park staff. The Seashore also administers approximately 19,000 acres of the north district of GGNRA. More than half of the Seashore -- the 32,373-acre Philip Burton Wilderness Area -- must be managed in conformance with the 1964 Wilderness Act, NPS Management Policies (NPS 2001a, Chapter 6), and the Director's Order and Reference Manual 41 for Wilderness Preservation and Management. The Wilderness Act requires that, except as necessary to meet the minimum requirements for the administration of a wilderness area, "there shall be no temporary roads, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, or no other form of mechanical transport, and no structure or installation" within the wilderness (16 U.S.C. 1131 et seq., Section 4 (c)).

Permanent park structures outside the Wilderness Area include:

- 3 visitor centers
- 2 environmental education centers
- 30 restroom complexes

- 4 backcountry campgrounds
- 17 water systems
- 147 miles of trails
- Over 100 miles of roads
- Over 100 public and administrative structures, and
- 27 sewage treatment systems

The Seashore also manages and protects park cultural resources including:

- 297 historic structures
- 127 recorded archaeological sites
- 11 identified cultural landscapes
- 498,000 museum objects

Financial resources available to achieve the park's annual goals include a base-operating budget of approximately $5.6 million. In addition, the park receives supplemental support for fire operations, cyclic maintenance, special natural resource projects, and repair and rehabilitation of structures. Apart from the Park Service program, there are numerous commercial leases within the Seashore operating businesses, farms, ranches, and an aquaculture production. Leases include:

- 6 dairies
- 9 beef cattle ranches
- Silage production on approximately 1,000 acres of land,
- Oyster production in Drakes Estero, and
- Water supply to Bolinas Community

Project Operation and Management Resources

Planning and other activities conducted for the proposed project to date have been almost exclusively funded out of non-Park Service monies. The wetland restoration component has received funding from a Caltrans mitigation, SS Cape Mohican oil spill settlement funds and several private and federal grant sources (Gordon and Betty Moore Foundation, National Fish and Wildlife Foundation, North American Wetlands Conservation Act, National Wetlands Conservation Act). The funding from CalTrans and Cape Mohican has covered expenses of from one to two term FTE employees and occasional seasonal hires involved in planning and overseeing the proposed project. Since acquisition of the property, annual expenditures for the project, including personnel, monitoring, some property maintenance, and contracting for baseline studies including hydraulic and hydrodynamic modeling, ranged from $132,026 to $277,833 annually through September 2005. Personnel costs incorporated most of the environmental compliance activities for the proposed project, including scoping, alternative workshops, and preparation of this document, as well as a substantial amount of the vegetation and wetland-related baseline studies. The Seashore is currently applying for funding from at least three more private grant sources. It is anticipated that private funding would entirely pay for any further planning needs (i.e., permitting) and implementation or construction of the proposed project.

The proposed project has received some federal funds and support. Federal monies used for the proposed project came from $1.55 million in Congressional appropriations used to purchase the Giacomini Ranch and two competitive grant programs (Conservation Challenge Initiative and Park Service-USGS). Permanent base-funded Seashore staff has assisted with administration of the project, such as contracting, payroll, benefits administration, personnel, and maintenance associated with immediate operations and maintenance needs. On an annual basis, it is estimated that, on average, permanent, base-funded staff contribute less than 25 FTE days each year to the proposed project.

The Giacomini Ranch currently has no park facilities. Maintenance is not performed by Park staff currently on an annual basis, as most of the maintenance with the exception of the 2003 West Pasture levee repair and sediment removal from the 1906 Drainage downstream of the Lucchesi residence has been conducted by the Giacominis as part of their on-going operation of the ranch under a Reservation of Use agreement until spring 2007. However, immediate operations and maintenance needs such as repair of the Fish Hatchery Creek culvert and tidegate in 2003 and annual sedimentation removal from the 1906 Drainage due to flooding of adjacent private residences have been overseen by park maintenance personnel. Because the Giacominis continue to operate the Giacomini Ranch, existing informal social paths are not currently maintained by the Seashore.

Intentionally Left Blank

Chapter 4

Environmental Consequences and Mitigation Measures

Introduction

The role of impact analysis is to "fairly, objectively, and candidly display the projected impacts of each alternative" (NPS 2004). The potential impacts of each alternative on the environment are analyzed for each of the impact topics or subtopics discussed in Chapter 3. For each of the impact topics, an indicator or a suite of indicators is chosen for analysis based on U.S. Department of Interior (DOI) NEPA-related guidance, CEQA significance criteria, laws, regulations, policies, and local ordinances. In using indicators, CEQ requests that impacts be quantified as much as possible and described in terms of their context, duration, and intensity, which are described more below (NPS 2001). In addition, impacts must include not only direct impacts from project implementation, but indirect and cumulative impacts: these are impacts that are either indirectly associated with implementation of the proposed project or that result from actions taken outside the proposed project that affect the same resources as the proposed project.

In addition to presenting the analysis of impacts, Chapter 4 describes the methodology used to evaluate potential impacts from the No Action and four action alternatives. The chapter first outlines a general methodology common to all impact topics and a list and short description of projects that will be considered during the cumulative impacts analysis. It then discusses the methodology specific to each impact topic addressed in Chapter 3 (e.g., Air Resources, Water Resources, Public Health and Safety).

Within each impact topic, the specific methodology used for evaluating impacts to the resource or public or social service is detailed, which includes any additional discussion of regulations, laws, policies, or ordinances needed to understand the framework for evaluation. An introduction to the relevant regulations, laws, policies, and ordinances often used to frame the description of the Affected Environment impact topics can be found in Chapter 3 for most of the impact topics. The impact topic methodology section also incorporates a description of the indicator or suite of indicators used to evaluate impacts, the assumptions used in evaluating impacts, the relevant context or contexts for the indicator or indicators used, and the specific thresholds used to assess intensity.

The impacts analysis section then assesses the potential impact of the No Action alternative and four action alternatives on each resource or service using the indicator or indicators discussed, characterizing the intensity, duration, and context of the impacts, as well as indicating whether they are direct or indirect. If measures, such as standardized best management practices (BMPs) for example, are mandatory or are certain to be implemented, impacts are analyzed assuming the measures are in place. These mitigation measures are described in Chapter 2. However, if mitigation depends on funding, permits or other decisions that are not absolute, impacts are analyzed both with and without mitigation in place. CEQA requires that mitigation measures must be fully enforceable to reduce an impact below the level of significance.

These impacts are then assessed relevant to other ongoing or reasonably foreseeable future projects within the local region or other appropriate frame of context to determine cumulative impacts to the resource or impact topic. The information for each impact topic is then summarized in a conclusions section.

Park Service policy also requires that sustainability and the long-term management implications of the proposed project be evaluated. This section evaluates: 1) The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; 2) Any irreversible or irretrievable commitments of resources that would be involved if the proposed project were implemented; and 3) Any adverse major impacts that could not be avoided or fully mitigated if the proposed project was implemented. In addition, CEQA mandates disclosure of: 1) Significant environmental effects which cannot be avoided if the proposed project is implemented and 2) Significant irreversible environmental changes which would be involved in the proposed project should it be implemented; as well as 3) Growth-inducing impact of the proposed project.

General Methodology for Assessing Impacts

National parks are directed to assess the extent of impacts on resources and services as defined by the context, duration, and intensity of the effect. For the purposes of the proposed project, which incorporates both Park Service and State lands, potential impacts are generally described in terms of the nature of the impact (Are the effects beneficial or adverse?), duration (Are the effects restricted to the construction period, relatively short-term, or long-term?), intensity (Are there no effects or would effects be negligible, minor, moderate, major, or constitute impairment of park resources), type of impact (Are the effects direct, indirect, and/or cumulative?) , and context (Are the effects restricted to the Project Area, local community, watershed, region, or supraregional or spanning larger regions or many regions; Table 24). Because definitions of intensity (negligible, minor, moderate, major, or impairment) and context (Project Area, local community, watershed, regional, etc.) vary greatly by impact topic, more detailed intensity and context definitions are provided separately for each impact topic analyzed in this document. A more detailed description of these categories and the general methodology for impact analysis can be found below.

Baseline Conditions

The use of the word, "change," implies a change relative to some existing condition. The change or impact potentially caused by the proposed project is typically evaluated relative to the baseline condition. For an EIS or EIR, baseline conditions are typically described as the conditions within the Project Area at the time the Notice of Intent and/or Notice of Preparation is issued. A general description of baseline conditions can be found in Chapter 2. A detailed description of resources and services in the Project Area and vicinity is the subject of Chapter 3 and the basis for evaluating potential impacts for implementation of the No Action or any one of the four action alternatives.

Nature of Impacts

Impacts from the proposed project can either be ***Beneficial*** by enhancing or improving resource values or social values and services or ***Adverse*** by degrading or lessening resource values or social values and services. Some actions can have both adverse and beneficial impacts. In addition, in some cases, the change would be considered neutral or not really beneficial or adverse. These neutral impacts are not evaluated in Chapter 4.

Intensity of Impacts

In a sense, the evaluation of the intensity of impacts represents one of the most important parts of Chapter 4, NEPA and CEQA approach the issue somewhat differently.

TABLE 24. GENERAL METHODOLOGY FOR ASSESSING IMPACTS

Nature	Describes the nature of the impact's overall effect on the environment. Nature is generally described as: *Beneficial* (enhancing or improving resource values or social services and values); or *Adverse* (lessening or degrading resource values or social services and values). Some projects may effect change that is considered to have a neutral impact or a change that would be considered neither beneficial nor adverse. These neutral changes are not evaluated in Chapter 4.
Intensity	Describes the degree to which an impact would affect a given resource or service. For the proposed project, impacts are generally described as: *No impact* (causing no change); or *Negligible* (causing no measurable change or change that is barely detectable and often within the natural range of variability); or *Minor* (causing small, but detectable or measurable change); or *Moderate* (causing apparent or appreciable change); or *Major* or Substantial (causing striking, highly-noticeable change. Often considered a "significant" effect under CEQA); or *Impairment* (causing substantial change to park resources that violates conditions of the Organic Act or park legislation: relevant to Park Service lands only).

TABLE 24. GENERAL METHODOLOGY FOR ASSESSING IMPACTS

Duration	Describes the length of time that an impact would affect a given resource. Many impacts can occur over multiple timeframe or duration periods. Duration is generally described as: *Construction* (restricted to the construction period only); or *Short-term* (restricted to a two- to three-period only); or *Long-term* (continuing beyond two to three years).
Type	Describes the type of relationship between the proposed project and the impact. Type is generally described as: *Direct* (actions of the proposed project would directly effect this change); or *Indirect* (actions of the proposed project would not effect this change, but would enable change to occur, or change would occur later in time, or farther in distance than the actions); and/or *Cumulative* (actions of the proposed project would have an additive effect with the actions of other past, ongoing, or reasonably foreseeable future projects).
Context	Describes the geographic context in which the impacts will be evaluated. Impacts may be evaluated using one or multiple contexts. Context is generally described as: *Project Area* (limited to the Project Area); and/or *Local Community* (extending beyond the Project Area to the neighboring human communities in southern Tomales Bay); and/or *Watershed* (extending beyond the Project Area and southern Tomales Bay to encompass the entire Tomales Bay watershed); and/or *Regional* (extending beyond the Tomales Bay watershed to encompass 1) the entire park; OR 2) coastal Marin County; OR 3) the entire Marin County; OR 4) entire San Francisco Bay area (this can include Critical Habitat Recovery Units for certain special status wildlife species); and/or *Supraregional* (extending beyond the San Francisco Bay area to either the entire state or coastline of California or some multijurisdictional range for a special status species, etc.).

Under NEPA, this evaluation provides information on the intensity or degree of impacts that have been determined through earlier review to be potentially significant and is relevant to the choice of a particular NEPA "pathway" (e.g., Environmental Assessment or EIS). Under CEQA, this analysis enables the CEQA lead agency to determine whether an impact on the environment will be significant or less than significant on the environment. The *State CEQA Guidelines* defines "significant effect on the environment" as: "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (*Guidelines* Section 15382). Under both NEPA and CEQA, the potential for significant impacts on the environment or human environment trigger a more detailed evaluation and analysis of a proposed project through preparation of an EIS or an EIR, however, for CEQA, only ***adverse*** changes require preparation of an EIR, while, under Department of the Interior (DOI) NEPA guidelines, both potentially significant adverse **or** beneficial changes may require preparation of an EIS.

In determining significance of impacts, many CEQA documents such as EIRs generally categorize impacts are "significant" or "less than significant" based on stated significance criteria. As noted above, CEQA defines significance as a substantial or potentially substantial adverse change on the environment. CEQA has developed criteria that should be considered in determining whether the proposed project will have an effect on the environment, such as *Guidelines* issued both by the state and the County of Marin. However, within these guidelines, the definition of significant in terms of what is a "substantial" or significant effect has been left to lead agencies to determine. In CEQA, the point at which an impact goes from being less than significant to significant is called a threshold of significance. The threshold of significance is either a quantitative or qualitative standard, or set of criteria, pursuant to which the significance of a given environmental effect may be determined (OPR 1994). Under CEQA, significant impacts can be mitigated through measures designed to avoid or reduce the level of impact to less than significant. Those significant impacts that cannot be mitigated to a level that is less-than-significant are discussed under the "Avoidable and Unavoidable Major or Significant Adverse Impacts" section.

CEQ, which regulates implementation of NEPA, does not use significance other than to determine the appropriate NEPA pathway. DOI provides general criteria to guide evaluation during early planning stages of whether a proposed project might "significantly affect the quality of the human environment." To determine whether impacts might be significant, an identified threshold of significance can be used such that proposed projects whose impacts potentially fall above the established threshold would be considered to have potentially significant effects (Bass et al. 2001). Once the potential for a significant effect is determined to exist, significance is no longer used to evaluate specific impacts. Rather, the Park Service documents typically incorporate a fairly broad range of evaluation criteria or impact thresholds to determine the level or intensity

of an effect, ranging from negligible or barely detectable change to major or striking or highly apparent change.

Because this document must satisfy both NEPA and CEQA requirements, impacts will be analyzed using a broad range of evaluation criteria or impact thresholds, with the level or an intensity of effects ranging from negligible to major or substantial change. For each impact indicator, the intensity of effect associated with a substantial or significant impact under CEQA will be identified. Some agencies establish standard thresholds that are used for environmental compliance for all agency projects. Because considerations of intensity and context vary widely from park to park and even between projects within parks, the Park Service does not necessarily encourage parks to develop standardized impact thresholds. The CSLC has also not adopted thresholds.

Even when there are no standardized thresholds, the Park Service encourages project proponents to develop impact thresholds or evaluation criteria for individual projects to assist in analyzing the intensity of impacts for resource topics being evaluated. For this project, then, evaluation or significance criteria were specifically developed for indicators under each impact topic using information from a variety of sources. These sources included federal, state, and local regulations, laws, and policies; consultation with subject matter experts; best professional judgment of document preparers; and thresholds established for other Park Service projects, wetland restoration projects in the region and state, and local projects that are not necessarily wetland-related.

Evaluation or significance criteria may be based on standards such as the following:

- A health-based standard such as air pollutant emission standards, water pollutant discharge standards, or noise levels.
- Service capacity standards such as traffic level of service, water supply capacity, or waste treatment plant capacity.
- Ecological tolerance standards such as physical carrying capacity, impacts on declared threatened or endangered species, loss of prime farmland, or wetland encroachment.
- Cultural resource standards such as impacts on historic structures or archaeological resources.
- Other standards relating to environmental quality issues, such as those listed in the Guidelines' Initial Study Checklist or Appendix G of the Guidelines.

The DOI NEPA Guidelines encourage development of impact thresholds or evaluation criteria that are "based to the extent possible on scientific and factual data" and legal standards and policies (NPS 2004). Criteria may be either qualitative or quantitative, although impacts should be quantified as much as possible (NPS 2004). Some effects, such as traffic or noise, lend themselves to numerical standards; others, such as aesthetics are difficult to quantify and may rely more upon qualitative descriptions. In addition, qualitative standards may be used when available information is not sufficient enough to warrant use of numerical standards or to be able predict quantitatively the outcome should a particular alternative be implemented.

In this document, evaluation or significance criteria are generally based on the following analytical approaches:

- *Change/Trend*: The degree to which existing levels or areal extent of a particular resource might change should the proposed project be implemented and the direction of that change (i.e., increase, decrease).
- *Target/Threshold*: Effects of the proposed project on a particular resource relative to a target or threshold. Target or threshold numbers may derive from regulations, laws, or policies (e.g., water quality objectives in the RWQCB Basin Plan or acreage "triggers" in regulations governing impacts to wetlands and riparian habitat) or more subjective evaluation of the threshold at which significant impacts might occur (e.g., degree of flooding relative to existing conditions). Some of the target/threshold criteria may assess the project in relation to existing conditions of a particular resource or resource issue such that the focus is on the proposed project's contribution to the total "load" or whether implementation of the proposed project would add to existing levels such that a threshold might be crossed (e.g., water quality objectives, flooding, salinity intrusion into municipal groundwater wells, etc.).
- *Qualitative*: When quantitative thresholds are not available or do not make sense, changes that might result from the implementation of the proposed project are discussed in a qualitative rather than in a quantitative or semi-quantitative manner.

Impairment

For Park Service lands, another criterion is evaluated, which is the potential for impairment of park resources. The Park Service Management Policies (NPS 2006) require an analysis of potential effects of proposed projects to determine whether or not actions would impair park resources identified as a Park Service goal or in enabling legislation or as key to integrity of the park. Impairment determinations are made solely by Park Service managers and apply only to Park Service lands.

The fundamental purpose of the national park system, as established by the Organic Act and reaffirmed by the General Authorities Act, begins with a mandate to conserve park resources and values.

The Organic Act of 1916 states that the Park Service:

> *…shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations…by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein…*

Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible Park Service manager, would harm the integrity of park resources or values.

An impact to any park resource or value may constitute impairment, but an impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Identified in the ***Organic Act***;
- Necessary to fulfill specific purposes identified in the ***establishing legislation*** or proclamation of the park;
- Key to the natural or cultural ***integrity of the park***; or
- Identified as a ***goal in the park's general management plan*** or other relevant Park Service planning documents.

In general, potential for impairment is evaluated for cultural and natural resources and especially values which parks were specifically established to protect, such as the pastoral landscape. Impairment may also be considered for visitor experience when the condition of the resource directly affects the nature of the visit to the park. The Park Service does not address impairment with regards to operations, public health and safety, socioeconomics, and other non-resource topics.

Enabling legislation for the Seashore and for the GGNRA make clear reference to the natural historic, scenic, and recreational values of this portion of the central California coastline. The GGNRA was established by Congress "in order to preserve for public use and enjoyment certain areas of Marin and San Francisco Counties, California, possessing outstanding natural, historic, scenic, and recreational values, and in order to provide for the maintenance of needed recreational open space necessary to urban environment and planning…(PL 92-589)." The north district of the GGNRA is administered by the Seashore. The Seashore was established by Congress "to save and preserve, for the purpose of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped" (PL 87-657).

Impairment may not be allowed to occur from Park Service activities in managing the park, visitor activities, or activities undertaken by contractors and others operating in the park.

The following steps were taken to determine whether the alternatives had the potential to impair park resources and values:

1. The park's enabling legislation, the *General Management Plan,* and other relevant background were reviewed with regard to the unit's purpose and significance, resource values, and resource management goals or desired future conditions.
2. Management objectives specific to resource protection goals at the park were identified.
3. Criteria were established for each resource of concern to determine the context, intensity and duration of impacts, as defined above.
4. An analysis was conducted to determine if the magnitude of impact reached the level of "impairment," as defined by Park Service Management Policies.

Mitigation

Mitigation measures are actions undertaken to avoid, reduce, or offset identified adverse impacts. NEPA requires that an EIS must include a discussion of the "means to mitigate adverse environmental effects" (40 CFR 1502.16(h)). In an EIS, mitigation measures must be discussed for all impact intensities, major or otherwise. CEQA requires that significant adverse impacts must be mitigated. As noted earlier, significant impacts for the preferred alternative that, for some reason, cannot be mitigated to a level of insignificance are considered significant and unavoidable and discussed in a separate section of this chapter, "Avoidable and Unavoidable Major or Significant Adverse Impacts section" (State CEQA Guidelines 15126.2(b). CEQ and State CEQA Guidelines recommend consideration of five types of mitigation measures: avoiding, minimizing, rectifying, reducing, and compensating (40 CFR 1508.20; State CEQA Guidelines 15370). Mitigation measures that are mandatory to implementation of the proposed project are discussed in Chapter 2 and include Best Management Practices or BMPs to avoid, minimize, or reduce the impact from construction. Optional mitigation measures that are subject to further discussions with regulatory agencies, etc., are discussed in this chapter. In some cases, measures to avoid or reduce potentially adverse impacts were incorporated into the design of the alternatives and are not specifically identified as mitigation measures. CEQA requires that each public agency adopt objectives, criteria, and specific procedures to administer its responsibilities under the Act and the CEQA Guidelines (Section 21082). This statute includes preparation of a Mitigation Monitoring and Monitoring Report that lists the specific mitigation measures that are considered mandatory and how compliance with or completion of this mitigation measures would be determined. A Mitigation Monitoring and Reporting document is included in Appendix B.

Duration of Impacts

For projects such as the one proposed, impacts from implementation can generally occur over three timeframes. Implementation or ***Construction*** generally has its own unique set of impacts that are limited to the construction period, such as noise or traffic potentially generated by construction equipment. Within the first few years after implementation, the Project Area would be in a disturbed state from recent construction even though the earthwork portion would have ended. During this ***Short-Term*** period, the potential for certain types of impacts might be higher due to the fact that vegetation has not had enough time to recolonize within portions of the Project Area disturbed by earthwork activities. The potential for these short-term impacts decreases considerably after the first few years***. Long-Term*** impacts are those associated with what might be considered equilibrium or design conditions in the Project Area after earthwork-related and short-term disturbance conditions have passed. ***In general, if impacts would potentially occur during all duration timeframes, but potential impacts during construction or shortly after construction would not differ from long-term ones, construction and short-term impacts are not separated from long-term ones***.

Type of Impacts

Both NEPA and CEQA require the consideration of direct, indirect, and cumulative impacts that might result from the proposed project. ***Direct*** impacts are those that occur at the same time and location as the proposed project. For example, excavation of sediment as part of the proposed project removes soils and alters topographic resources, which would be the direct impacts. Conversely, ***Indirect*** impacts are those actions that occur later in time or are located at a distance from the proposed project. For example, sediment that falls into adjacent waters can increase turbidity thousands of feet downstream of the proposed project, and projects that increase visitor facilities can indirectly encourage growth-inducing impacts that occur later in time. For many projects, indirect effects are often ones that are related to changes in land use patterns, population density, or growth rate that may subsequently affect air, water, and other natural systems (Bass et

al. 2001). If there is uncertainty regarding future land use, agencies are not required to speculate regarding future uses, but to make an educated decision based on "reasonably foreseeable occurrences" (Bass et al. 2001). ***Cumulative*** impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Under the State CEQA Guidelines, cumulative impacts refer to two or more individual affects which, when considered together, are considerable or which compound or increase other environmental impacts (State CEQA Guidelines 15355). Cumulative effects are discussed in more depth later in this chapter.

Context of Impacts

The geographic area or boundary in which impacts to a particular resource or service are pertinent and need to be evaluated varies considerably among impact topics. For the proposed project, several general contexts were identified, which included the ***Project Area*** (the Giacomini Ranch, Olema Marsh, and portions of the undiked marsh north of the Giacomini Ranch); the ***Local Community*** (towns of Point Reyes Station, Inverness Park, Olema, and northern portion of the Olema Valley); ***Watershed*** (the entire Tomales Bay watershed stretching from the highest elevations of the Coast Range to the mouth of Tomales Bay and the Pacific Ocean); ***Region*** (varies from the Seashore and the north district of the GGNRA to Marin County to the entire San Francisco Bay region); and ***Supraregion*** (encompassing either the state, portions of the state of California such as central California, or ranges for wildlife and plant species). In certain instances, impacts to resources are considered from several contextual levels such as Project Area and watershed.

Projects Considered in Cumulative Impacts Analysis

While this document focuses on the Giacomini Wetland Restoration Project, specifically on the proposed actions and their impacts, ultimately, the effects of the proposed actions on physical, natural, and socioeconomic resources are integrally tied to the effects of other proposed projects and cannot be evaluated without considering the cumulative effect of relevant actions. A cumulative effect is "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Under the State CEQA Guidelines, cumulative impacts refer to two or more individual affects which, when considered together, are considerable or which compound or increase other environmental impacts (State CEQA Guidelines 15355). Cumulative effects may be the result of multiple, individually minor actions that aggregate to produce an adverse result over a period of time (40 CFR Sec. 1508.27), and a significant impact may exist if an action is related to other actions that have individually insignificant, but cumulatively significant, impacts (40 CFR Sec. 1508.27[b][7]). Cumulative effects may exert additive impacts on a resource or service, or effects may be synergistic (i.e., multiplicative or non-linear in cumulative effect) or even to some degree offsetting with one project potentially benefiting and another impacting a resource.

NEPA and CEQA require agencies to analyze the potential of their proposed actions to contribute to any cumulative effects identified in the project region or other appropriate context. Because ***cumulative effect*** refers by definition to a combined effect, there is no cumulative effect on a resource unless more than one action affects that resource, or a single action or activity results in repeated, but discrete, effects on the resource. Accordingly, the first step in analyzing cumulative effects is to identify the resources that have the potential to be affected by more than one action or activity during the timeframe analyzed. Once the cumulative effects have been identified, a proposed action's potential to contribute to each can be evaluated.

This document used the "list" approach, in which the additive, synergistic, or offsetting effects of specific actions proposed for an area are considered as a whole. For most resources, this cumulative effects analysis addressed the Tomales Bay watershed, including Olema Valley, with the following exceptions:

- Effects on air quality were analyzed for the watershed and adjacent downwind portions of the Bay Area Air Quality Management District (BAAQMD);
- Effects on traffic were analyzed for the whole of Marin County; and
  Effects on wildlife and certain plant species were analyzed based on the localized portion of the range or distribution that might be affected. Range or distribution during critical portions of a wildlife species' life cycle, such as breeding, nesting, or rearing, were considered most important. The range

or distribution analyzed varied among species, with the principal Regions of Influence being: 1) the entirety of the Seashore and north district of GGNRA, 2) the Marin-Sonoma County coastline, 3) Marin County, and 4) San Francisco Bay.

The analysis included planned or "reasonably foreseeable" actions slated for implementation within the next 5 years (through 2011). Past, present, and "reasonably foreseeable" future projects are listed in Table 25. Information from other planning documents prepared both by the Park Service and other agencies and organizations was used to help compile information on projects being planned or considered. In addition, information on wetland restoration projects in Marin and San Francisco Bay was obtained from the San Francisco Wetland Project Tracker database/GIS system (www.projecttracker.org), as well as environmental documentation prepared for individual projects. Numerous small wetland restoration projects are currently being planned in San Francisco Bay in counties other than Marin. For the purposes of this analysis, restoration projects formally listed that are outside Marin County are limited to the largest projects that would be more likely to have a cumulative effect on actions undertaken outside San Francisco Bay on the Marin County coastline. However, the cumulative effect of these projects on wildlife and plant species is taken into account.

TABLE 25. ACTIONS INCLUDED IN CUMULATIVE EFFECTS ANALYSIS

Action, Location, and Project Proponent	Overview
Land Exchange; Giacomini Ranch (Point Reyes Station/Inverness Park; National Park Service, Giacomini Family)	The National Park Service is proposing to exchange parcels along C Street in Point Reyes Station that are part of the former Waldo Giacomini Ranch for low-lying parcels in the West and East Pastures of the ranch that are still owned by the Giacomini family. Public scoping as part of environmental compliance was conducted in 2006. Negotiations are still ongoing between the Park Service and the Giacomini family, but the proposed project could involve demolition of some of the barns at the Giacomini Ranch dairy in 2007.
Bear Valley Creek Watershed Enhancement and Fishery Restoration Project (Bear Valley; Marin; Point Reyes National Seashore Association/ Coastal Conservancy/Seashore)	This action occurs directly upstream of Olema Marsh and the Project Area in the middle and upper portions of the Bear Valley Creek watershed. The proposed project would involve replacement of undersized and otherwise underperforming culverts with either new culverts or bridges. An enhancement plan is in the process of being prepared, and work may be conducted over the next five years.
Culvert Cleaning, Western Outlet, Bear Valley & Silver Hills Drainage (Point Reyes Station; Marin) (Point Reyes Station/Inverness Park; Marin)	This proposed action would involve removing sediment from the former western outlet for Bear Valley Creek, which now primarily contains flows from Silver Hills Creek. Sediment would be excavated from: 1) the drainage ditch running on the south side of Levee Road at the Bear Valley Road intersection; 2) the box culvert underneath Levee Road; and 3) the section of channel in between Levee Road and Lagunitas Creek. Three (3) sediment detention basins would be constructed in the drainage ditch near Silver Hills Creek. The County of Marin Department of Public Works hopes to start this proposed action in fall 2007, depending upon completion of environmental compliance requirements.
Sir Francis Drake Boulevard Repaving Project (Point Reyes Station/Inverness Park; Marin)	This proposed action would involve repaving the section of Sir Francis Drake Boulevard between State Route 1 and through Inverness Park. The County of Marin Department of Public Works recently received funding to complete this project in 2007. The proposed action is currently scheduled to start in fall 2007.
Housing Development Project (Point Reyes Station, Marin; Pacific Artisans LLC)	Pacific Artisans LLC is proposing to develop four homes on a property located at the intersection of Pt Reyes-Petaluma Road and State Route 1. A fifth lot may be developed for low-cost housing. This site is located approximately 1.5 miles east of the Giacomini Ranch portion of the Project Area. The proposed project is in the planning and design phase.
Residential Home Development; C Street, Point Reyes Station (Point Reyes Station; Marin)	While a project has not been proposed for the lands owned by the Giacomini Trust on C Street in Point Reyes Station directly adjacent to the Project Area, most of these parcels are zoned coastal residential (CRAB-2). This action was considered to be a reasonably foreseeable action and was incorporated into the cumulative effects analysis. The total number of homes that could be potentially built on these lands is uncertain, but could total as many as 10 at maximum allowable buildout for all lands along C Street, although specific site circumstances could dictate decreased density.

TABLE 25. ACTIONS INCLUDED IN CUMULATIVE EFFECTS ANALYSIS

Action, Location, and Project Proponent	Overview
North Marin Water District Adjunct Well Development (Point Reyes; Marin; North Marin Water District)	This proposed action would involve the construction of an additional well upstream of the Coast Guard wells to meet current demand, particularly during high tide periods in Lagunitas Creek when salinity intrusion events can occur. An exact location for this well has not been identified, although NMWD has strongly been considering further development of the existing emergency well at the Gallagher Ranch (Figure 37). The agency is currently seeking funding for this purpose.
Chicken Ranch Beach Wetland Restoration Project (Inverness; Marin; Environmental Action Committee/ Tomales Bay Watershed Council)	This proposed action would occur on the western edge of Tomales Bay near Inverness approximately 3 miles northwest of the Project Area. The proposed project would create a functioning, self-perpetuating wetland, maintain an accessible swimming beach, and improve the potential water quality problems that may exist within one of the drainages to this former lagoon that was filled through the influence of a number of disturbance-related factors. A restoration plan is in the process of being prepared.
Coastal Watershed Restoration -- Drake's Estero Road Crossing (Point Reyes, Marin; Seashore)	This action includes the replacement or enhancement of road crossing facilities to accommodate natural hydrologic process and fish passage at six sites within the Drakes Estero watershed. These sites are located approximately 4.5 miles northwest of the Project Area. The Finding of No Significant Impact (FONSI) was approved in October 2006. Implementation is anticipated in 2007.
Horseshoe Pond Restoration to Coastal Lagoon (Point Reyes, Marin; Seashore)	This action involved the removal of spillway and dam materials to restore natural hydrologic and shoreline process to a 35-acre area immediately west of the mouth of Drake's Estero. This site is located approximately 7.3 miles northwest of the Project Area. It also restored and enhanced the access road, borrow quarry, and former waste lagoon to more natural conditions. The project was implemented in 2004.
Glenbrook Dam/Quarry Restoration Project (Point Reyes, Marin; Seashore)	This action involves the removal of dam remains and restoration of the borrow areas at the mouth of Glenbrook Creek in the Estero de Limantour. This site is located approximately 4.2 miles northwest of the Project Area. The draft EA is expected to be released soon. Implementation is anticipated in 2007.
Coastal Watershed Restoration – Geomorphic Restoration Project (Point Reyes, Marin; Seashore)	The project is intended to restore natural conditions and increase estuarine habitat at Point Reyes. At three sites – two near Limantour Beach and one at Glenbrook Creek -- construction across stream or estuarine habitat impedes natural process and is not consistent with long-term park and Park Service management objectives. The nearest of these sites is located approximately 2.9 miles west of the Project Area. The Finding of No Significant Impact (FONSI) was approved in October 2006, and implementation is anticipated in 2008.
Sand, Rock, and Gravel Plan (Point Reyes, Seashore)	The Seashore has a number of quarries within the park that have been used by ranches for removing soils needed for ranch management. Because of the amount of land degradation, the Seashore is planning on restoring the quarries by either regrading the existing topography or rebuilding more natural topographic contours using imported soils. Compliance for actual restoration of the quarries will be undertaken in a separate environmental document.
General Management Plan Update (Point Reyes, Marin; Seashore)	The Seashore is currently in the process of updating its General Management Plan for the Seashore and the north district of GGNRA, specifically Olema Valley and Tomales Bay. This is a long-term strategic planning document that would establish management direction in the park for the next 10–20 years. The EIS is currently being prepared, and the draft EIS is expected to be released in 2007.
Lawson's Landing Master Plan (Dillon Beach, Marin; Lawson's Landing)	Lawson's Landing Campground and RV Park is in the process of preparing an EIR for master planning and expansion of the existing campground and RV Park. This facility is located approximately 14 miles from the Project Area at the very northern end of Tomales Bay. The project would involve construction of a septic system, new water tanks, and new buildings. The proposed project is currently in hiatus, but a new EIR may be prepared in the future.
East Shore Wastewater Improvement Project (Marshall, Marin; County of Marin)	The County is proposing to construct a community wastewater system to replace individual substandard and marginally operating septic systems for 91 currently developed commercial and residential properties in Marshall and to form a wastewater district. Marshall is located approximately 6.6 miles north of the Project Area in Tomales Bay. The County recently released the FEIS/EIR for this project.
Wetland and Creek Restoration at Big Lagoon (Muir Beach, Marin; GGNRA, County of Marin, Green Gulch Zen Center)	GGNRA is proposing a tidal wetland, riparian, and dune restoration project on lower Redwood Creek at Muir Beach. Muir Beach is located approximately 20.5 miles southwest of the Project Area. The project would eliminate or replace impediments to natural hydrologic processes such as bridges, berms, and earthen fill, thereby improving habitat for native habitats and wildlife. A final EIS/EIR is currently being prepared, with possible implementation of the project starting in 2008.

TABLE 25. ACTIONS INCLUDED IN CUMULATIVE EFFECTS ANALYSIS

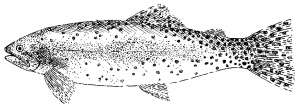
Action, Location, and Project Proponent	Overview
Bolinas Lagoon Ecosystem Restoration Project **Bolinas Lagoon Project (Cont.)** (Bolinas, Marin; County of Marin, Corps)	In the late 1990s, the Corps in cooperation with the County of Marin proposed to dredge Bolinas Lagoon for the purposes of restoring this coastal ecosystem, which had been purportedly impacted by excessive sedimentation. Bolinas Lagoon is located approximately 12.4 miles southwest of the Project Area. Following public review of the draft document, the county assumed management of the project and began re-examining whether dredging for restoration was really necessary. A new EIS/EIR may be prepared in 2007.
Hamilton Wetland Restoration Project (Novato, Marin; Corps and Coastal Conservancy)	The Corps and Coastal Conservancy are proposing to restore tidal wetlands at the former Hamilton Army Airfield, adjacent CSLC property, and the Bel Marin Keys Unit V property on the western margin of San Francisco Bay. Hamilton is located approximately 17.4 miles northeast of the Project Area. Dredge material would potentially be used to restore wetland habitat on 988 acres at the Hamilton Airfield and CSLC property. A Final EIS/EIR and Supplemental EIS/EIR have been prepared.
Bahia Acquisition and Wetland Restoration Project (Novato, Marin; Marin Audubon Society)	Marin Audubon Society (MAS) is pursuing a 330-acre wetland restoration project at the Bahia property on the western margin of San Francisco Bay. Bahia is located approximately 15.2 miles northeast of the Project Area. The project is in the final phases of planning and should be implemented shortly.
Triangle Marsh (Corte Madera, Marin; Marin Audubon Society, Coastal Conservancy, BCDC).	MAS and the Coastal Conservancy are planning a 16-acre wetland restoration project at Triangle Marsh on the western margin of San Francisco Bay. The site is located approximately 21 miles southeast of the Project Area. This project is in the planning phase.
Petaluma Marsh Expansion Project (Marin-Sonoma Counties; Marin Audubon Society, Coastal Conservancy)	MAS and the Coastal Conservancy are planning a 102-acre tidal marsh restoration project at MAS property in the Petaluma Marsh in north San Francisco Bay. Petaluma Marsh is located approximately 15 miles northeast of the Project Area. This project is in the planning phase.
Napa-Sonoma Marsh Restoration Project (San Pablo Bay, San Francisco Bay; Coastal Conservancy, Corps, California Department of Fish and Game)	The Coastal Conservancy, Corps, and California Department of Fish and Game (CDFG) are proposing a salinity reduction and habitat restoration project for the 9,460-acre Napa River Unit of the Napa-Sonoma Marshes Wildlife Area (NSMWA), formerly part of the Cargill Salt Pond operation in the North Bay of San Francisco. The site is located approximately 27 miles northeast of the Project Area. A Final EIS and EIR have been released, and the project is scheduled for implementation shortly.
South Bay Salt Pond Restoration Project (South San Francisco Bay; Coastal Conservancy; U.S. Fish and Wildlife Service, CDFG)	The State of California and the Federal government are conducting restoration of 15,100 acres of Cargill Salt Company's former salt ponds in South San Francisco Bay, which will be the largest wetland restoration project on the West Coast. The site is located approximately 62 miles southeast of the Project Area. The draft EIS/EIR was released in spring 2007, with construction expected to start in 2008.
Updated Marin Countywide Plan (County of Marin)	The County of Marin is currently in the process of updating the Marin Countywide Plan. The CWP is a general plan for the county that is used as a strategic document to guide decisions on development, land use, traffic, and other issues. A draft EIR for the CWP update was released in January 2007.

Resource-Specific Assessment of Impacts

Land Use and Planning – General Land Use

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Tomales Bay, the Point Reyes region, and offshore areas fall within a complex, multi-jurisdictional region, with lands in a variety of ownership, including private, County, local water districts, state agencies (State Land Commission, State Parks, Wildlife Conservation Board, CalTrans), and federal agencies such as the Park Service, the Gulf of the Farallones National Marine Sanctuary, and the U.S. Coast Guard. Several agencies and organizations have established land use plans or guidance for development within this unincorporated portion of Marin County. These land use plans or guidances include the Point Reyes Station Community Plan, the Marin County Local Coastal Program (LCP) Unit II, the Marin Countywide Plan, and the Marin County Zoning Ordinance. In the Coastal Zone of California, LCPs actually supersede all local land use planning and take precedence over all other local policies and zoning on state, local, and privately owned lands. The Project Area falls within the Marin County LCP Unit II. On federal lands, projects are guided both by the LCP (Marin County Comprehensive Planning Department 1981) – as federal agencies must be consistent with the policies



of the Coastal Act – and the General Management Plan (GMP). A description of these federal, state, and local policies can be found in Chapter 3 under Land Use and Planning.

Many of the policies regarding general land use have been directly incorporated into significance criteria established under both state and county CEQA guidelines.

General Assumptions and Methodologies

- Relevant policies differ depending on land ownership.
- Park Service lands, including the Giacomini Ranch and the southern portion of Olema Marsh, are subject to the LCP and GMP policies.
- State, local, and privately owned lands, including the undiked marsh north of Giacomini Ranch, the northern portion of Olema Marsh, White House Pool and Green Bridge County Parks, and most of Lagunitas Creek, are subject to the LCP, the Marin CWP, and, in some instances, the Point Reyes Station Community Plan.
- For each alternative, consistency with the relevant land use, zoning, and agricultural of policies is evaluated. Impacts were considered major under NEPA or substantial and significant under CEQA if the policy was violated.
- ***Certain policies relating to geologic hazards, streams, water quality, wetlands, riparian buffers, flooding, water supply and other public services, public access, visual resources, transportation, noise, and other subjects covered are evaluated under other focused impact topics***.

Specific General Land Use-Related Assumptions and Methodologies

- A number of relevant planning documents have established policies regarding general land use and development.
- In most cases, adherence to relevant policies is evaluated as a whole without individually evaluating specific policies (e.g., LCP policies on development).
- In specific instances, individual policies are evaluated separately, including, but not limited to, those policies that appear strongly relevant to the proposed project or are specific CEQA criteria.
- Depending upon the policy, either an expanded range of impact thresholds are provided (e.g., negligible through major criteria), or, for policies that appear to involve strictly compliance or no compliance, the range is collapsed to two or three criteria such as 1) no impact, 2) negligible/minor/moderate, and 3) major under NEPA or substantial under CEQA.

Described below are specific assumptions and methodologies for some of the impact indicators outlined in Table 26.

- *LCP -- Natural Resources on Federal Parklands*: Impact thresholds were scaled to encompass a range of activities expected to occur under existing management plans on federal parklands from activities expected to have barely detectable effects on parklands such as vegetation clearing associated with road and trail maintenance (negligible) to substantial activities such as large-scale controlled burns (major).
- *Community Station Plan – Increase Demand for Recreational Facilities*: Effects on demand in the local community for recreational facilities and on existing recreational facilities are evaluated under Visitor and Resident Experience – Public Access Resources.
- *Community Station Plan -- Induce Substantial Growth*: Marin County has substantially lower overall growth rate (0.6 percent) in 2005 compared to many fast-growing counties in California that exceed 2 to 3 percent as a whole (California Department of Finance 2006). Because of this, impact thresholds were scaled to reflect growth rates only among Marin County cities, with Novato having the highest growth rates (1.4 percent), San Rafael and other cities showing slight increases (0.5-0.6 percent). A comparison of growth rates among other San Francisco Bay region cities suggested that Novato grew at a moderate pace in comparison to some other cities in the generally slow-growing San Francisco Bay region, including Dublin, Oakley, American Canyon, San Ramon, Emeryville, and Brentwood, which ranged from 3.0 to 9.1 percent growth in 2005 (California Department of Finance 2006). Point Reyes Station currently has 362 existing residential units and, based on zoning, there is potential for 326 additional residential units (Point Reyes Station Community Plan; Marin County Community Development Agency 2001). Based on the assumption of 2 percent being a high growth rate relative to other Marin County communities, proposed

projects that would result in the addition of more than 7 new housing units would be considered a major effect under NEPA and a substantial effect under CEQA.

- *Community Station Plan -- Displace Existing Housing*: To maintain equitable standards of evaluation, potential displacement of existing housing was evaluated using the same impacts thresholds as inducement of substantial growth.

TABLE 26. LAND USE AND PLANNING- GENERAL LAND USE

Source: Seashore/north district GGNRA General Management Plan, LCP Zone II/CCC, Marin CEQA guidelines, Community Plan **Nature**: Beneficial, Adverse **Context**: Regional **Duration**: Long-Term		
Seashore/north district GGNRA General Management Plan **Context**: Regional (Park Service lands)		
Would conflict with general policies of the GMP or constitute an impairment of land use standards.	No Impact/ Not Applicable	The proposed project would NOT affect GMP policies or land use standards established in enabling legislation; land use-related resources identified as critical to parks; or land use-related goals in Park Service management policies.
	Negligible/ Minor/ Moderate	The proposed project would NOT conflict with general policies of GMP or constitute an impairment of land use standards established in enabling legislation; land use-related resources identified as critical to parks; or land use-related goals in Park Service management policies park resources.
	Major	The proposed project would conflict with general policies of GMP.
Local Coastal Program **Context**: Regional (Zone II; Park Service, State, Local, and Privately Owned Lands)		
Would involve the modification or alteration of natural resources on federal parklands?	No Impact/ Not Applicable	The proposed project would NOT involve the modification or alteration of natural resources on federal parklands.
	Negligible	The proposed project would involve the alteration of natural resources on federal parklands, but impacts would be relatively negligible (<0.001 percent of the total park area or <1 acre) and would be related to such activities as vegetation clearing near existing roads and trails.
	Minor	Would involve the alteration of natural resources on federal parklands, but impacts would be relatively small (<0.01 percent of the total park area or < 8 acres).
	Moderate	Would involve the alteration of natural resources on federal parklands, but impacts would be relatively moderate (<0.1 percent of the total park area or < 80 acres)
	Major	Would involve the alteration of natural resources on federal parklands, and the impacts would be major (>0.1 percent of the total park area or ≥ 80 acres).
Coastal Resources and Planning Management Policies **Context**: Regional (Coastal Zone; Park Service, State, Local, and Privately Owned Lands)		
Would conflict with general policies on development in the Coastal Zone (Article 6)?	No Impact/ Not Applicable	The proposed project would NOT affect development in the Coastal Zone
	Negligible/ Minor/ Moderate	The proposed project would affect development in the Coastal Zone, but would comply with policies.
	Major or Substantial	The proposed project would affect development in the Coastal Zone and conflict with general policies on development.
Would conflict with general policies on industrial development in the Coastal Zone (Article 7)?	No Impact/ Not Applicable	The proposed project would NOT affect industrial development in the Coastal Zone.
	Negligible/ Minor/ Moderate	The proposed project would affect industrial development in the Coastal Zone, but would comply with policies.
	Major or Substantial	The proposed project would affect industrial development in the Coastal Zone and conflict with general policies on industrial development.

TABLE 26. LAND USE AND PLANNING- GENERAL LAND USE

Point Reyes Station Community Plan/Marin Countywide Plan **Context**: Local Community, Regional (Marin County; State, Local, and Privately Owned Lands)		
Would conflict with land-use related policies of Marin CWP, including land use designation or zoning standards?	No Impact/ Not Applicable	The proposed project would NOT affect land use.
	Negligible/ Minor/ Moderate	The proposed project would affect land use, but would not conflict with land use-related policies of Marin CWP, including land use designation or zoning standards.
	Major or Substantial	The proposed project would affect land uses and conflict with land use-related policies of Marin CWP, including land use designation or zoning standards.
Would conflict with applicable environmental plans or policies adopted by Marin County?	No Impact/ Not Applicable	The proposed project would NOT affect environmental plans or policies adopted by Marin County.
	Negligible/ Minor/ Moderate	The proposed project would affect environmental plans or policies adopted by Marin County, but would NOT conflict with them.
	Major or Substantial	The proposed project would conflict with environmental plans or policies adopted by Marin County.
Result in substantial alteration of the character or functioning of the community or present or planned future use of an area?	No Impact/ Not Applicable	The proposed project would NOT affect the character or functioning of the community or present or planned future use of an area.
	Negligible	The proposed project would have negligible effect on the character or functioning of the community or present or planned future use of an area with change barely perceptible to town residents.
	Minor	The proposed project would have minor effect on the character or functioning of the community or present or planned future use of an area by causing a noticeable change, but one that does not alter the character or the functioning of the community.
	Moderate	The proposed project would have moderate effect on the character or functioning of the community or present or planned future use of an area by causing an apparent or appreciable change that would affect the rural character or functioning of the community or present or planned future use of an area to some degree.
	Major or Substantial	The proposed project would result in substantial alteration of the character or functioning of the community or present or planned future use of an area.
Increase density that would exceed the official population projections for the planning area within which the Project Area is located as set forth in either the CWP or Community Plan?	No Impact/ Not Applicable	The proposed project would NOT affect density for the planning area.
	Negligible/ Minor/ Moderate	The proposed project would affect density, but would NOT exceed the official population projections for the planning area.
	Major or Substantial	The proposed project would increase density such that it would exceed the official population projections for the planning area.
Induce substantial growth in an area either directly or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)?	No Impact/ Not Applicable	The proposed project would NOT induce growth in an area either directly or indirectly.
	Negligible	The proposed project would induce negligible growth (<<1 percent) or up to approximately two (2) new housing units in the area either directly or indirectly.
	Minor	The proposed project would induce minor growth (~1 percent) or between three (3) and four (4) new housing units in the area either directly or indirectly.
	Moderate	The proposed project would induce moderate growth (< 2 percent) or between five (5) and seven (7) new housing units in the area either directly or indirectly.
	Major or Substantial	The proposed project would induce substantial growth (> 2 percent) or more than seven (7) new housing units in the area either directly or indirectly.
Displace existing housing, especially	No Impact/ Not Applicable	The proposed project would NOT affect existing housing.

TABLE 26. LAND USE AND PLANNING- GENERAL LAND USE

affordable housing?	Negligible	The proposed project would have negligible effect on existing housing in area through loss of << 1 percent (≤ 2 housing units) of homes present in 2000.
	Minor	The proposed project would have minor effect on existing housing in area through loss of ~ 1.0 percent (≤ 4 housing units) of homes present in 2000.
	Moderate	The proposed project would have moderate effect on existing housing in area through loss of < 2.0 percent (≤ 7 housing units) of homes present in 2000.
	Major	The proposed project would have major or substantial effect on existing housing in area through loss of > 2.0 percent (> 7 housing units) of homes present in 2000.

Impact Analysis

TABLE 27. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR LAND USE AND PLANNING – GENERAL LAND USE.
All impacts assumed to be Adverse unless otherwise stated, Long-Term, and Local Community (Point Reyes) or Regional (LCP Zone II, Marin County, or Seashore/north district of the GGNRA).

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Conflict with GMP Policies	No Impact	No Impact	No Impact	No Impact	No Impact
Modification of Natural Resources on Parklands	Beneficial - Moderate	Beneficial - Major	Beneficial - Major	Beneficial - Major	Beneficial - Major
Conflict with Development Policies in Coastal Zone	No Impact	No Impact	No Impact	No Impact	No Impact
Conflict with Industrial Development Policies in Coastal Zone	No Impact	No Impact	No Impact	No Impact	No Impact
Conflict with County Land Use Policies	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor
Conflict with County Environmental Plans/Policies	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor
Alter Character of Community	Minor	Minor	Minor	Minor	Minor
Increase Density Beyond Population Projections	No Impact	No Impact	No Impact	No Impact	No Impact
Induce Substantial Growth Directly or Indirectly	No Impact	No Impact	No Impact	No Impact	No Impact
Displace Existing Housing	Negligible	Negligible	Negligible	Negligible	Negligible

No Action Alternative

Analysis: The impacts of the No Action Alternative would generally range from an adverse minor impact to a beneficial moderate impact on general and park-related land use and land use and development policies in the Seashore and local community (Table 27). Under this alternative, the Project Area would be operated in compliance with existing Park Service management policies, General Management Plans (NPS 1980), and plans and policies established by the Park Service, the Seashore, and the California Coastal Commission (CCC) regarding general land use within parks and, where relevant, other local land use policies.

Relative to baseline conditions, the No Action Alternatives does have the potential to cause moderate beneficial impacts to natural resources on federal parklands through compliance with the Park Service's existing mitigation agreement with CalTrans, under which the Park Service is required to restore a minimum of 3.6 acres of wetland. The Park Service is proposing to restore up to 11 acres of wetlands to ensure that mitigation requirements are satisfied and to minimize the amount of levee removal and new levee construction that would need to be performed (see Chapter 2 for more detailed description). Also, under the Park Service's existing purchase agreement with the Giacomini Trust, the Reservation of Use Agreement with the Giacomini family would expire in March 2007, at which point the dairy would close. With the close of the dairy, all maintenance and other agricultural management practices would cease, although there would be the potential for a leased grazed through a separate environmental review process. The intensity of leased grazing would be expected to be lower than that under baseline conditions, and it is possible that the Seashore would institute requirements on resource setbacks and on the intensity, duration, and timing of grazing. These factors would be expected to have a beneficial effect on natural resources.

The No Action Alternative would have no impact on most of the LCP, Marin County, and Point Reyes Station Community Plan policies relating to development. This alternative would have a negligible/minor effect on County Land Use policies such that land use in the Giacomini Ranch might potentially be changed from a dairy to grazing land or open space, but this conversion would not conflict with this property's Agricultural Production – 60 (A-60) zoning. The close of the dairy would result in the loss of worker housing adjacent to Tomasini Creek and in Inverness Park, which would have a negligible adverse effect on housing. This issue is discussed further under Land Use and Planning – Agricultural Land Use. This alternative would have the potential to affect County environmental plans and policies, but actions would be expected to be consistent, and, so, therefore, impacts would be negligible/minor.

Conversion of the dairy to either leased grazing or open space would have the potential to alter the character or functioning of the Point Reyes Station community or the present or planned future use of an area. This effect would be expected to be noticeable due to the removal of the dairy facility and odors and sounds associated with the dairy that permeate the town of Point Reyes Station. However, the removal of the dairy would not be expected to alter the rural character or functioning of the community, and from public comments made during scoping, workshop, and other meetings, it is apparent that many in the local community would welcome removal of the truck-related noise and odors of the dairy. Therefore, this alternative would have only minor impacts on Point Reyes Station Community Plan's policies related to altering character of the community.

This alternative would conflict to some degree with policies stated in the Point Reyes Station Community Plan that call for restoration of the former tidal marshes at the headwaters of Tomales Bay to natural conditions and protection of Tomasini Creek and restoration of the creek to its historic alignment in the East Pasture.

Possible Additional Mitigation Measures: No additional mitigation measures would be performed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Projects with the potential to have cumulative effects with this alternative would be the potential commercial-residential development along C Street in Point Reyes Station and a proposed project by Pacific Artisans LLC to develop four homes on a property near Pt. Reyes Petaluma Road and State Route 1. While not even a formal proposal, the former project was considered to be on the outer envelope of reasonably foreseeable, as the highest and best uses of the former dairy facility lands that are owned by the Giacomini Trust would be residential or commercial development. As this alternative would have no direct or indirect impacts on land use policies relative to development, it is unlikely that there would be a cumulative effect on development in the local community. This alternative could enhance the attractiveness of building in the Project Area vicinity to some degree, but this alternative and the others are unlikely to ultimately affect the development future of lands in the Project Area vicinity, as this region is already scenic and highly attractive from a development viewpoint.

However, there could be a cumulative adverse effect on the rural character and functioning of the community. The degree of change that would result from conversion of the dairy to leased grazing or open space, combined with potential development of up to 10 homes on Point Reyes Mesa, would cause a noticeable change, but the likelihood that these changes would cumulatively result in a large enough change to alter the rural character or functioning of the community is low. Even with development of these homes, these projects would be unlikely to have more than a minor adverse effect on the character and functioning of the community, because they are unlikely to affect the rural character of Point Reyes and the Project Area vicinity. Potential additional residential unit distributions within the town of Point Reyes Station as specified in the Community Plan allows for almost a potential doubling of the number of homes from 362 to 688 within the planning area (Marin County Community Development Agency 2001). The maximum number of CRAB-2 (10,000 square-foot-minimum lots) units that could potentially be built under this plan was listed as 7, with CRAB-3 (Residential Agriculture 20,000 square-foot-minimum lots) having 140 additional potential units (Marin County Community Development Agency 2001). In combination with the proposed project, full build-out of all the residential unit distributions specified within the Community Plan would have a major or substantial impact on the rural character and functioning of the local community, however, it is not reasonably foreseeable that a build-out of this magnitude would occur given the decades-long emphasis on slow or no residential growth.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of the No Action Alternative would generally range from an adverse minor impact to a beneficial moderate impact on general and park-related land use and land use and development policies in the Seashore and local community. It would have a moderate beneficial effect on natural resources on parklands through a small wetland restoration/mitigation component and the discontinuation of intensive agricultural management practices, if not necessarily grazing. This alternative does have the potential, particularly in combination with some proposed and reasonably foreseeable housing development projects in Point Reyes Station, to have a minor adverse effect on the rural character and functioning of the local community by causing a noticeable change in conditions, but this change would not be expected to noticeably alter the rural nature of the local community and environs.

Alternative A

Analysis: Alternative A would have very similar effects as the No Action Alternative on general and park-related land use and land use and development policies in the Seashore and the local community, with a few exceptions (Table 27). Under Alternative A, the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. The increase in scale of restoration efforts under Alternative A would elevate the potential intensity of effects on CCC policies regarding modification of natural resources on parklands from beneficial and moderate under the No Action Alternative to major and beneficial under Alternative A.

As with the No Action Alternative, Alternative A would have no impact on most of the LCP, Marin County, and Point Reyes Station Community Plan policies relating to development and would have only a negligible/minor effect on County Land Use policies such that land use in the Giacomini Ranch would be changed from a dairy to open space. This issue is discussed further under Land Use and Planning – Agricultural Land Use. As under the No Action Alternative, the close of the dairy would result in the loss of worker housing located adjacent to Tomasini Creek and in Inverness Park, which would have a negligible adverse effect on housing. This alternative would have the potential to affect County environmental plans and policies, but actions would be expected to be consistent, and, so, therefore, impacts would be negligible/minor.

Conversion of the dairy to open space would have the potential to have a minor effect or alteration of the character or functioning of the Point Reyes Station community or the present or planned future use of an area. This effect would be expected to be potentially slightly more noticeable than under the No Action Alternative due to the fact that there would be no potential for leased grazing that would have retained some of the agricultural character of the Giacomini Ranch. However, the removal of the dairy and conversion to tidal marsh and uplands would not be expected to alter the rural character or functioning of the community, and from public comments made during scoping, workshop, and other meetings, it is apparent that many in the local community would welcome removal of the truck-related noise and odors of the dairy.

Unlike the No Action Alternative, this alternative would not conflict with policies stated in the Point Reyes Station Community Plan that call for restoration of the former tidal marshes at the headwaters of Tomales Bay to natural conditions, although it would not restore Tomasini Creek to its historic alignment as was identified in one of the other Community Plan policies.

Possible Additional Mitigation Measures: No additional mitigation measures would be performed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of Alternative A would generally range from minor adverse to beneficial major

impacts on general and park-related land use and land use and development policies in the Seashore and local community. It would have a major beneficial effect on natural resources on parklands through restoration of the East Pasture, discontinuation of agricultural management practices and grazing, and removal of agricultural infrastructure. As with the No Action Alternative, this alternative does have the potential, particularly in combination with some proposed and reasonably foreseeable housing development projects in Point Reyes Station, to have a minor adverse effect on the rural character and functioning of the local community by causing a noticeable change in conditions, but this change would not be expected to fundamentally alter the rural nature of the local community and environs.

Alternative B

Analysis: Alternative B would have identical similar effects as Alternative A on general land use and land use policies in the Seashore and the local community (Table 27).

Possible Additional Mitigation Measures: No additional mitigation measures would be performed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative B would generally have identical impacts as Alternative A on general and park-related land use and land use and development policies in the Seashore and local community, with the intensity of effects ranging from no impact to major beneficial. It would have a major beneficial effect on natural resources on parklands through restoration of the East and West Pastures, discontinuation of agricultural management practices and grazing, and removal of agricultural infrastructure. As with Alternative A, this alternative does have the potential, particularly in combination with some proposed and reasonably foreseeable housing development projects in Point Reyes Station, to have a minor adverse effect on the rural character and functioning of the local community by causing a noticeable change in conditions, but this change would not be expected to fundamentally alter the rural nature of the local community and environs.

Alternative C

Analysis: Alternative C would have almost identical effects as Alternative A on general and park-related land use and land use policies in the Seashore and the local community, with one exception (Table 27).

Unlike the No Action Alternative and Alternatives A and B, this alternative would involve restoration of at least a portion of Tomasini Creek within the Project Area to one of its historic alignments, as well as restoring former tidal marshes at the headwaters of Tomales Bay to natural conditions. Both of these objectives are incorporated into the Point Reyes Station Community Plan (Marin County Community Development Agency 2001).

Possible Additional Mitigation Measures: No additional mitigation measures would be performed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative effects would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative C would generally have almost identical effects to Alternative A on general and park-related land use and land use and development policies in the Seashore and local community, with the

intensity of effects ranging from minor adverse to major beneficial. It would have a major beneficial effect on natural resources on parklands through restoration of the East Pasture and West Pasture and Olema Marsh, discontinuation of agricultural management practices and grazing, and removal of agricultural infrastructure. Unlike the No Action and Alternatives A and B, this alternative would at least partially comply with objectives stated in the Point Reyes Station Community Plan regarding realignment of Tomasini Creek in the Project Area into its historic alignment, as well as restoration of former tidal marshes at the head of Tomales Bay. As with Alternative A, this alternative does have the potential, particularly in combination with some proposed and reasonably foreseeable housing development projects in Point Reyes Station, to have a minor adverse effect on the rural character and functioning of the local community by causing a noticeable change in conditions, but this change would not be expected to fundamentally alter the rural nature of the local community and environs.

Alternative D

Analysis: Alternative D would have almost identical effects as Alternative C on general and park-related land use and land use policies in the Seashore and the local community, with one exception (Table 27).

Unlike Alternative C, this alternative would involve restoration of the entire portion of Tomasini Creek within the Project Area to one of its historic alignments, as well as restoring former tidal marshes at the headwaters of Tomales Bay to natural conditions. Both of these objectives are incorporated into the Point Reyes Station Community Plan (Marin County Community Development Agency 2001).

Possible Additional Mitigation Measures: No additional mitigation measures would be performed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative effects would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative D would generally have almost identical effects to Alternatives A, B, and C on general and park-related land use and land use and development policies in the Seashore and local community, with the intensity of effects ranging from minor adverse to major beneficial. It would have a major beneficial effect on natural resources on parklands through restoration of the East Pasture and West Pasture and Olema Marsh, discontinuation of agricultural management practices and grazing, and removal of agricultural infrastructure. Unlike Alternative C, this alternative would wholly comply with objectives stated in the Point Reyes Station Community Plan regarding realignment of Tomasini Creek in the Project Area into its historic alignment, as well as restoration of former tidal marshes at the head of Tomales Bay. As with Alternative A, this alternative does have the potential, particularly in combination with some proposed and reasonably foreseeable housing development projects in Point Reyes Station, to have a minor adverse effect on the rural character and functioning of the local community by causing a noticeable change in conditions, but this change would not be expected to fundamentally alter the rural nature of the local community and environs.

Land Use and Planning – Agricultural Land Use

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Farmland is protected under various federal, state, and local laws, regulations, and policies. At a federal level, the Farmland Protection Policy Act is intended to minimize the impact federal programs have on the unnecessary conversion of farmland to non-agricultural uses. Because of the value of agriculture to Marin's economy and its scenic pastoral landscape, the County and Coastal Zone LCP (Marin County Comprehensive Planning Department 1981) have both identified maintenance of agriculture as a high priority. A more detailed description of federal and county agricultural land use policies can be found under Land Use and Planning in Chapter 3.

The LCP for Zone II (Marin County Community Development Agency 1981), which includes the Project Area, incorporates several agricultural-related policies for both federal parklands and state, local, and private lands. One of these policies concerns potential changes to lands zoned as Agricultural Production Zone. LCP policies strive to protect and enhance continued agricultural use and to contribute to agricultural viability within the region (Marin County Community Planning Agency 1981). Development of these lands must conform to either permitted or conditional uses specified in the LCP for Agricultural Production Zone lands. Permitted uses include livestock and poultry; horses; dairy and poultry farming; vegetable, fruit, nut, and field crops; nursery products; and single family dwelling. Conditional uses include land divisions, fish hatcheries, greenhouses, game or nature preserve or refuge, public or private recreational activities such as hunting, fishing, and camping. One of the conditions of development is that the proposed land division or development would not conflict with the continuation of agriculture on adjacent parcels and that the proposed development would have no significant adverse impacts on environmental quality or natural habitats, including stream and riparian habitats and scenic resources.

State and local agencies have developed significance criteria under CEQA that address impacts to agricultural resources such as soils, operations, and contracts such as the Williamson Act contracts, which provides lower property tax assessments to farmers in exchange for limiting land use to agricultural or open space-related purposes. Under Public Resources Code Section 21060.1 of CEQA, the Farmland Mapping and Monitoring Program (FMMP) is used to define agricultural land for the purposes of assessing environmental impacts to agricultural lands under CEQA. Impacts to these agricultural lands can be evaluated using a California Agricultural Land Evaluation and Site Assessment (LESA) program, which is the state version of the LESA developed by the National Resources Conservation Service (NRCS) for federal agencies. LESA provides lead agencies with an optional methodology to ensure that potentially significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the CEQA environmental review process (Public Resources Code Section 21095).

Specific Agricultural Land Use-Related Assumptions

- Because of the importance of agriculture to West Marin and Marin County in general, a number of relevant planning documents have established policies regarding agriculture.
- All potential impacts related to agriculture are evaluated in this section, including impacts to Williamson Tract lands, Prime and Unique Farmland soils, effects on agricultural resources and operations, and adjacent agricultural land use, etc.
- In general, potential impacts to agricultural lands and resources that are protected through federal, state, and local laws, regulations, and policies will be evaluated through use of the California LESA Model analysis, which is recommended by the state.
- Certain CEQA significance criteria that do not appear to be covered by the LESA evaluation are addressed in separate impact indicators below (Table 28).
- The California Agricultural LESA methodology establishes a series of alternate scores for assessing intensity of impacts to agricultural resources and determining whether they are significant or less-than-significant. Under Park Service NEPA guidance, parks are expected to evaluate impacts under a broader context that rates impacts as "No Effect," "Negligible," "Minor," "Moderate," and "Major." To allow for this broader evaluation of impacts, the cut-off scores for impacts that would be considered significant under CEQA were equated with major impacts under NEPA, and the range of possible scores below this cut-off score was equally divided, where possible, to obtain numerical thresholds for Negligible to Moderate impacts. See Appendix C for more detail.
    - Ratings are separated into two major categories: Land Evaluation and Site Analysis. Land Evaluation assesses the Land Capability Classification and the Storie Index Ratings, which are two different systems for classifying the agricultural productivity or value of soils. The Site Analysis component focuses on the size of the Project Area; water resources availability; surrounding agricultural land use; and surrounding protected resource land rating.
    - The LESA Instruction Manual (California Department of Conservation 1997) incorporates guidance on the significance of impacts to agricultural resources under CEQA through evaluating total scores for both rating categories, as well as separate consideration of subscores for Land Evaluation and Site Analysis.
- Depending upon the policy, either an expanded range of impact thresholds is provided (e.g., negligible through major criteria), or, for policies that appear to involve strictly compliance or no compliance, the range is condensed into two or three thresholds such as 1) no impact, 2) negligible/minor, and 3) moderate/major (Table 28).

TABLE 28. LAND USE AND PLANNING - AGRICULTURAL LAND USE

Source: Seashore/north district GGNRA General Management Plan, LCP Zone II/CCC, Marin CEQA guidelines, Community Plan **Nature**: Beneficial, Adverse **Context**: Regional **Duration**: Long-Term		
Seashore/north district GGNRA General Management Plan **Context**: Regional (Park Service lands)		
Would conflict with general policies of the GMP regarding agriculture or agricultural land uses or constitute an impairment of agricultural resources identified in enabling legislation.	No Impact/ Not Applicable	The proposed project would NOT affect GMP policies regarding agriculture or agricultural land uses.
	Negligible/ Minor/ Moderate	The proposed would NOT conflict with general policies of GMP regarding agriculture or agricultural land uses.
	Major	The proposed project would conflict with general policies of GMP regarding agricultural or agricultural land uses.
Local Coastal Program **Context**: Regional (Zone II; Park Service, State, Local, and Privately Owned Lands)		
Would discontinue agricultural land uses in the GGNRA and Seashore or would continue them at a level which is not compatible with protection of natural resources and public recreational uses?	No Impact/ Not Applicable	The proposed project would NOT affect agricultural lands in the GGNRA or the Seashore
	Negligible	***Beneficial***: The intensity of agricultural management on park lands would be reduced slightly to increase compatibility of agricultural land use with resource protection. ***Adverse***: The intensity of agricultural management on park lands would be increased slightly where agriculture is NOT compatible with resource protection; **OR** would be reduced slightly where agriculture land use is compatible with resource protection.
	Minor	***Beneficial***: The intensity of agricultural management on park lands would be reduced measurably where agricultural land use is NOT compatible with resource protection. ***Adverse***: The intensity of agricultural management on park lands would be increased measurably where agriculture is NOT compatible with resource protection; **OR** would be reduced measurably where agriculture land use is compatible with resource protection.
	Moderate	***Beneficial***: The intensity of agricultural management on park lands would be reduced appreciably where agricultural land use is NOT compatible with resource protection. ***Adverse***: The intensity of agricultural management on park lands would be increased appreciably where agriculture is NOT compatible with resource protection; **OR** would be reduced appreciably where agriculture land use is compatible with resource protection.
	Major or Substantial	***Beneficial***: Agricultural management on park lands would be discontinued where agriculture is NOT compatible with resource protection. ***Adverse***: The intensity of agricultural management on park lands would be increased substantially where agriculture is NOT compatible with resource protection; **OR** would be discontinued where agriculture land use is compatible with resource protection.
Would affect the use of lands in the Agricultural Production Zone (e.g., lands zoned A-60) and not be either a permitted or conditional use?	No Impact/ Not Applicable	The proposed project would NOT affect agricultural lands in the Agricultural Production Zone.
	Negligible	The proposed project would affect the use of lands in the Agricultural Production Zone, but would be a permitted use.
	Minor/ Moderate	The proposed project would affect the use of lands in the Agricultural Production Zone and would be a conditional use.
	Major or Substantial	The proposed project would affect the use of lands in the Agricultural Production Zone and not be either a permitted or conditional use.

TABLE 28. LAND USE AND PLANNING - AGRICULTURAL LAND USE

Coastal Resources and Planning Management Policies **Context:** Regional (Coastal Zone; Park Service, State, Local, and Privately Owned Lands)		
Would conflict with general policies on agriculture in the Coastal Zone, specifically on agricultural conversions (Article 5. Sections 30241, Sections 30242)?	No Impact/ Not Applicable	Would NOT affect agricultural lands in the Coastal Zone.
	Negligible/ Minor/ Moderate	Would affect agricultural lands in the Coastal Zone, but would comply with general policies on conversion of agricultural lands.
	Major or Substantial	Would affect agricultural lands in the Coastal Zone and conflict with general policies on conversion of agricultural lands.
Point Reyes Station Community Plan/Marin Countywide Plan **Context:** Local Community, Regional (Marin County; State, Local, and Privately Owned Lands)		
Affect agricultural or open space contracts (e.g., conflicts with Williamson Act contracts)?	No Impact/ Not Applicable	Would NOT affect agricultural or open space contracts.
	Negligible/ Minor/ Moderate	Would affect contracts, but would maintain use within the range of acceptable uses within the contract (e.g., switch from agricultural to open space lands).
	Major or Substantial	Would adversely affect agricultural and open contracts by converting to use or uses that are NOT within the range of acceptable uses.
Affect agricultural resources (e.g., impacts to productive agricultural soils; lands with sufficient water resources; and from incompatible land uses with adjacent protected lands)? *LESA Analysis*	No Impact/ Not Applicable	There would be no potential for an impact to agricultural resources.
	Negligible	There would be a barely detectable effect on agricultural resources such that the LESA score would total ≤20 points.
	Minor	There would be a measurable effect on agricultural resources such that: 1) the LESA score would total between 20 and 49 points; ***OR*** 2) the LESA score would be between 20 and 39 points if the Land Evaluation **OR** Site Analysis subscores ≥ 20 points.
	Moderate	There would be an appreciable effect on agricultural resources such that: 1) the LESA score would total between 50 and 79 points; ***OR*** 2) the LESA score would be between 40 and 59 points if the Land Evaluation **OR** Site Analysis subscores ≥ 20 points.
	Major or Substantial	There would be a substantial or major effect on agricultural resources such that: 1) the LESA score would total between 80 and 100 points; ***OR*** 2) the LESA score would be between 60 and 79 if the Land Evaluation **OR** Site Analysis subscores ≥ 20 points; ***OR*** 3) the LESA score would be between 40 to 59 points if the Land Evaluation **AND** Site Analysis subscores ≥ 20 points.

Impact Analysis

TABLE 29. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR LAND USE AND PLANNING - AGRICULTURAL LAND USE
All impacts assumed to be Adverse unless otherwise stated, Short-Term/Long-Term, and Local Community (Point Reyes) or Regional (LCP Zone II, Marin County, or Seashore/north district of the GGNRA).

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Conflict with GMP Policies on Agriculture or Agricultural Land Uses	No Impact	No Impact	No Impact	No Impact	No Impact
Discontinue Agriculture on Parklands or Continue at Level Not Compatible with Natural or Public Access Resources	Beneficial Minor/ Moderate	Beneficial Major	Beneficial Major	Beneficial Major	Beneficial Major
Affect Use of Lands in Agricultural Production Zone	Negligible/ Minor	Minor	Minor	Minor	Minor

TABLE 29. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR LAND USE AND PLANNING - AGRICULTURAL LAND USE
All impacts assumed to be Adverse unless otherwise stated, Short-Term/Long-Term, and Local Community (Point Reyes) or Regional (LCP Zone II, Marin County, or Seashore/north district of the GGNRA).

Conflict with Policies on Agriculture in Coastal Zone	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor
Affect Agricultural or Open Space Contracts	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor
Affect Agricultural Resources, Operations, or Adjacent Agricultural Land Uses (LESA Analysis)	Negligible/ Minor	Minor	Minor	Minor	Minor

No Action Alternative

Analysis: The effects of the No Action Alternative on agricultural lands and federal, state, and local agricultural land use policies would generally range from negligible/minor adverse to beneficial minor/moderate (Table 29). The Giacomini Ranch East and West pastures are currently zoned Agricultural Production Zone (APZ-60) and are covered under a Williamson Act Contract. The portion of Olema Marsh owned by Audubon Canyon Ranch is zoned Open Area, while the portion owned by the Seashore is zoned Agricultural, Residential, Planned. Neither parcel is covered under the Williamson Act or other agricultural or open space contract.

Under the terms of the existing purchase agreement, the Project Area will convert from a dairy in early 2007 to lands that would be largely managed as open space, although there is a potential for leased grazing. The purchase agreement signed in 2000 included a 7-year Reservation of Use Agreement during which time the dairy could continue to be operated until agreement expires in March 2007. At that time, the Park Services assumes full management of the East and West Pastures and a portion of the dairy facility on the Point Reyes Mesa, which includes the old calf barn, manure ponds, and half of the milking barn. The remainder of the dairy facility remains in Giacomini Trust ownership as it was not part of the purchase agreement, thereby effectively splitting the dairy facility operations in half and precluding continued operation of the Giacomini Ranch as a dairy. Portions of the pastures could potentially be leased for grazing of dairy heifers (young cows) or beef cattle through a separate environmental review process. Under this alternative, the scale of agricultural operations relative to baseline conditions, under which the Giacomini Ranch has been operated as a full-scale dairy operation, would either be reduced or eliminated altogether. A reduction in agricultural operations would result if, after the dairy is closed, lands are leased for grazing, because grazing is typically less intensive. In addition, the Seashore is likely to institute restrictions on leased grazing relating to resource setbacks, stocking density, and duration and timing of grazing. Approximately 11 acres of the East Pasture would be restored to wetlands and would be off limits to grazing cattle.

The potential for either a reduction or discontinuation in agricultural land uses would have a negligible or minor effect on agricultural contracts, as Williamson Act covers agricultural and open space land uses, and on use of lands in the Agricultural Production Zone (APZ). Dairy and livestock operations are both permitted uses under the APZ, while game and nature preserves or refuges are considered conditional uses. There would be no conflict with GMP policies on agriculture or agricultural-related resources.

More than 90 percent of the Giacomini Ranch is wetland and has been impacted by intensive management as a dairy since these historic tidal marsh lands were leveed in the 1940s. These impacts have reduced the quality of wetland conditions in the Giacomini Ranch and have reduced functionality of wetlands that might otherwise play a vital role in improving quality of Tomales Bay, which has been declared impaired by the Regional Water Quality Control Board (RWQCB) for poor water quality. The extensive amount of wetlands present, combined with the frequency of large-scale flooding and prolonged inundation due to its location in the bottomlands of an alluvial valley just downstream of the confluence of several major creeks, lessens the long-term suitability and viability of these lands for agriculture. During its operation as a dairy, the Giacomini family has been required to intensively manage these lands through levees, tidegates, culverts, ditching and dredging, pumping, and irrigation to maintain a viable dairy operation. Continuation of agricultural uses and these types of management practices would not be compatible with resource protection. Therefore, under this alternative, there would be potentially minor to moderate beneficial impacts (depending on potential for leased grazing) impacts to LCP policies regarding discontinuation or continuation of agriculture in federal parklands at levels that are not compatible with resource protection, because agricultural uses would either be reduced or discontinued. For this reason, it would also have only a negligible/minor adverse effect on LCP policies regarding conversion of agricultural lands. Even though lands would be converted from agriculture to

open space, it would comply with the general policies regarding conversions, specifically that lands were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)).

An analysis of the potential effects of agricultural land conversion using the LESA model (1997) developed by the California Department of Conservation leads to the conclusion that the effects of converting the Giacomini Ranch from a dairy to leased grazing or open space are either negligible or minor (Appendix C). If leased grazing were permitted in the future, this alternative would result in only a negligible conversion of agricultural land to non-agricultural uses based on a LESA score of less than or equal to 20 (16.93 points): the only conversion that would occur would be the approximately 11 acres where the wetland restoration/ mitigation component would be performed. If leasing grazing were not permitted, this alternative would have a minor effect on agricultural lands in the Project Area vicinity based on a LESA score of 33.99 points and Site Analysis and Land Evaluation subscores of 25.43 and 8.56 points, respectively. Based on CEQA significance criteria developed by the California Department of Conservation, a significant impact under CEQA would require a LESA score between 80 to 100 points; OR a score between 60 and 79 points if either the Land Evaluation or Site Analysis subscores were greater than or equal to 20 points; OR a LESA score between 40 and 59 points if both the Land Evaluation and Site Analysis subscores were greater than or equal to 20 points. For the more detailed analysis of impact intensity required by the Park Service, the California Department of Conservation significance threshold was divided into five categories, including No Impact.

Most of the Project Area has soils with a somewhat lower Land Capability Classification Rating of Class IV-VIII, although there was a smaller component where Farmland of Statewide Importance soils occur of LCC Class III. In the immediate vicinity of the Project Area, only 21 percent of the lands were being farmed, with 50 percent protected as resource lands and the rest being commercially or residentially developed. Approximately 26 percent is currently irrigated with either waters obtained from North Marin Water District (NMWD) or direct pumping, but the agreement with NMWD for provision of irrigation waters from the Downey Well would expire in July 2008, and the potential for provision of -- and viability of obtaining --irrigation waters from NMWD in the future is both physically and economically uncertain. The Park Service does not plan to continue irrigation once it assumes full management of the Giacomini Ranch.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Projects with potential cumulative impacts would be those that would involve conversion of agricultural lands or discontinuation of agriculture on Park Service and private and other public lands in the local community or West Marin region. It would also include projects that would affect agricultural resources, operations, or adjacent land uses. None of the projects in Table 25 would have substantial enough effects on agriculture that the cumulative impacts of those projects with the proposed project would be considered major or substantial and significant under CEQA, with any potential effects from projects considered negligible in intensity. However, dairies and ranches continue to close down in West Marin due to problems with economic viability and other factors. The closure of ranches in the future combined with the shift in use from full-scale dairy operation to open space and limited grazing would constitute potentially a minor to moderate impact on agricultural economic viability of West Marin agriculture.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of the No Action Alternative on agricultural lands and federal, state, and local agricultural land use policies would generally range from negligible/minor adverse to minor/moderate beneficial. This conversion would comply with local policies on conversion of agricultural lands and lands protected under the Williamson Act, because it would either be retained as grazing land or converted to open space, which is an approved or conditional use of agricultural lands, or because it would comply with exemptions for conversions of lands that were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)). Based on results from the LESA analysis, conversion of the Giacomini Ranch would represent only a negligible or minor adverse impact on agricultural land use in the local community, depending on whether leased grazing is approved (Appendix C). However, cumulative effects of other ranches closing could elevate the impacts from loss of the dairy and conversion to grazing land or open space to the

agricultural economic viability of West Marin agriculture to moderate. There would be potentially minor/moderate beneficial impacts relative to LCP policies regarding discontinuation or continuation of agriculture in federal parklands at levels that are not compatible with resource protection, because agricultural uses would either be reduced or discontinued in area that is more than 90 percent wetland. Agricultural management has reduced the quality of wetland conditions in the Giacomini Ranch and functionality of wetlands that might otherwise play a vital role in improving quality of Tomales Bay, which has been declared impaired by the Regional Water Quality Control Board (RWQCB) for poor water quality.

Alternative A

Analysis: The impacts of Alternative A on federal and local agricultural land use policies would generally range from minor adverse to major beneficial (Table 29). As noted under No Action, the Giacomini Ranch East and West pastures are currently zoned Agricultural Production Zone (APZ-60) and are covered under a Williamson Act Contract, while Olema Marsh is zoned Open Area and Agricultural, Residential, Planned and is not covered under the Williamson Act or other agricultural or open space contract. Under this alternative, the Project Area would be maintained as open space, with agricultural uses discontinued. Because open space is an allowable use under the Williamson Act Contract, this alternative would have only negligible/minor effect on agricultural contracts and minor effects on use of lands in the Agricultural Production Zone. Under the APZ, the proposed project would represent a shift from a permitted use (dairying and livestock) to a conditional use – game or nature preserve or refuge. There would be no conflict with GMP policies on agriculture or agricultural-related resources. Based on results of the LESA analysis discussed under the No Action Alternative, the conversion of the Giacomini Ranch would represent a minor impact to agricultural lands in the Project Area vicinity and local community (Appendix C).

With discontinuation of agriculture, there would be potentially major beneficial effects on LCP policies regarding discontinuation or continuation of agriculture in federal parklands at levels that are not compatible with resource protection, because continuation of agricultural uses at baseline conditions would not be compatible with resource protection. More than 90 percent of the Giacomini Ranch is wetland and has been impacted by intensive management as a dairy since these historic tidal marsh lands were leveed in the 1940s. These impacts have reduced the quality of wetland conditions in the Giacomini Ranch and have reduced functionality of wetlands that might otherwise play a vital role in improving the health of Tomales Bay, which has been declared impaired by the Regional Water Quality Control Board (RWQCB) for poor water quality. The extensive amount of wetlands present, combined with the frequency of large-scale flooding and prolonged inundation due to its location in the bottomlands of an alluvial valley just downstream of the confluence of several major creeks, also lessens the long-term suitability and viability of these lands for agriculture. During its operation as a dairy, the Giacomini family has been required to intensively manage these lands through levees, tidegates, culverts, ditching and dredging, pumping, and irrigation to maintain a viable dairy operation. For this reason, this alternative would have only a negligible/minor on LCP policies regarding conversion of agricultural lands. Even though lands would be converted from agriculture to open space, it would comply with the general policies regarding agricultural land conversions, specifically that lands were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)). .

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: As with the No Action Alternative, projects with potential cumulative impacts would be those that would involve conversion of agricultural lands or discontinuation of agriculture on Park Service and private and other public lands in the local community or West Marin region. It would also include projects that would affect agricultural resources, operations, or adjacent land uses. None of the projects in Table 25 would have substantial enough effects on agriculture that the cumulative impacts of those projects with the proposed project would be considered major or substantial and significant under CEQA, with any potential effects from projects considered negligible in intensity. However, dairies and ranches continue to close down in West Marin due to problems with economic viability and other factors. The closure of ranches in the future combined with the shift in use from full-scale dairy operation to open space would constitute potentially a moderate impact on agricultural economic viability of West Marin agriculture.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal

in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of Alternative A on agricultural lands and federal, state, and local agricultural land use policies would generally range from minor adverse to major beneficial. This conversion would comply with local policies on conversion of agricultural lands and lands protected under the Williamson Act or Agricultural Production Zone zoning, because it would be converted to open space or a wildlife refuge, which is either an approved or conditional use for these types of agricultural lands. It would also comply with exemptions in LCP agricultural land use policies for conversions of lands that were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)). Based on results from the LESA analysis, conversion of the Giacomini Ranch would represent only a minor adverse impact on agricultural land use in the local community (Appendix C). However, cumulative effects of other ranches closing could elevate the impacts from loss of the dairy and conversion to grazing land or open space to the agricultural economic viability of West Marin agriculture to moderate. There would be major beneficial effects relative to LCP policies regarding discontinuation or continuation of agriculture in federal parklands at levels that are not compatible with resource protection, because agricultural uses would either be reduced or discontinued in area that is more than 90 percent wetland. Agricultural management has reduced the quality of wetland conditions in the Giacomini Ranch and functionality of wetlands that might otherwise play a vital role in improving quality of Tomales Bay, which has been declared impaired by the Regional Water Quality Control Board (RWQCB) for poor water quality.

Alternative B

Analysis: Alternative B would have identical impacts to those described under Alternative A (Table 29).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative B would have identical impacts to those described under Alternative A.

Alternative C

Analysis: Alternative C would have identical impacts to those described under Alternative A (Table 29). The impacts of Alternative C on federal and local agricultural land use policies would generally range from minor adverse to major beneficial (Table 29). As noted under No Action, the Giacomini Ranch East and West pastures are currently zoned Agricultural Production Zone (APZ-60) and are covered under a Williamson Act Contract, while Olema Marsh is zoned Open Area and Agricultural, Residential, Planned and is not covered under the Williamson Act or other agricultural or open space contract. Under this alternative, the Project Area would be maintained as open space, with agricultural uses discontinued. Because open space is an allowable use under the Williamson Act Contract, this alternative would have only negligible/minor effect on agricultural contracts and minor effects on use of lands in the Agricultural Production Zone. Under the APZ, the proposed project would represent a shift from a permitted use (dairying and livestock) to a conditional use – game or nature preserve or refuge. There would be no conflict with GMP policies on agriculture or agricultural-related resources. Based on results of the LESA analysis discussed under the No Action Alternative, the conversion of the Giacomini Ranch would represent a minor impact to agricultural lands in the Project Area vicinity and local community (Appendix C).

With discontinuation of agriculture, there would be potentially major beneficial effects on LCP policies regarding discontinuation or continuation of agriculture in federal parklands at levels that are not compatible with resource protection, because continuation of agricultural uses at baseline conditions would not be

compatible with resource protection. More than 90 percent of the Giacomini Ranch is wetland and has been impacted by intensive management as a dairy since these historic tidal marsh lands were leveed in the 1940s. These impacts have reduced the quality of wetland conditions in the Giacomini Ranch and have reduced functionality of wetlands that might otherwise play a vital role in improving the health of Tomales Bay, which has been declared impaired by the Regional Water Quality Control Board (RWQCB) for poor water quality. The extensive amount of wetlands present, combined with the frequency of large-scale flooding and prolonged inundation due to its location in the bottomlands of an alluvial valley just downstream of the confluence of several major creeks, also lessens the long-term suitability and viability of these lands for agriculture. During its operation as a dairy, the Giacomini family has been required to intensively manage these lands through levees, tidegates, culverts, ditching and dredging, pumping, and irrigation to maintain a viable dairy operation. For this reason, this alternative would have only a negligible/minor on LCP policies regarding conversion of agricultural lands. Even though lands would be converted from agriculture to open space, it would comply with the general policies regarding agricultural land conversions, specifically that lands were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative C would have identical impacts to those described under Alternative A. The impacts of Alternative C on agricultural lands and federal, state, and local agricultural land use policies would generally range from minor adverse to major beneficial. This conversion would comply with local policies on conversion of agricultural lands and lands protected under the Williamson Act or Agricultural Production Zone zoning, because it would be converted to open space or a wildlife refuge, which is either an approved or conditional use for these types of agricultural lands. It would also comply with exemptions in LCP agricultural land use policies for conversions of lands that were not suited for agriculture prior to the conversion of agricultural lands (Section 30241 (c)). Based on results from the LESA analysis, conversion of the Giacomini Ranch would represent only a minor adverse impact on agricultural land use in the local community (Appendix C). However, cumulative effects of other ranches closing could elevate the impacts from loss of the dairy and conversion to grazing land or open space to the agricultural economic viability of West Marin agriculture to moderate. There would be major beneficial effects relative to LCP policies regarding discontinuation or continuation of agriculture in federal parklands at levels that are not compatible with resource protection, because agricultural uses would either be reduced or discontinued in area that is more than 90 percent wetland. Agricultural management has reduced the quality of wetland conditions in the Giacomini Ranch and functionality of wetlands that might otherwise play a vital role in improving quality of Tomales Bay, which has been declared impaired by the Regional Water Quality Control Board (RWQCB) for poor water quality.

Alternative D

Analysis: Alternative D would have identical impacts to those described under Alternative C (Table 29).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative D would have identical impacts to those described under Alternative C.

Geologic Resources

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Within California, there are two primary legislative acts that govern construction in areas prone to geologic hazards. California's Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code Section 2621 et seq.) prohibits the location across the traces of active faults of most types of structures intended for human occupancy and strictly regulates construction of these types of structures in corridors along active faults (earthquake fault zones). The San Andreas Fault Zone (SAFZ) is the only zoned fault within the boundaries of Marin County (Snyder and Smith Associates and Nichols-Berman 2002), and it runs through the center of the Project Area.

While the Alquist-Priolo Act specifically addresses hazards associated with surface fault rupture, the Seismic Hazards Mapping Act of 1990 (California Public Resource Code Sections 2690-2699.6) specifically focuses on other hazards related to earthquakes such as ground shaking, liquefaction, and seismically induced landslides. In unincorporated areas, counties such as Marin are required to regulate development in mapped Seismic Hazard Zones or "zones of required investigation" through requiring appropriate site geologic and soil investigations and mitigation measures as part of permit review. Seismic Hazard Zone maps have only been prepared so far for a few Bay area and southern California counties, and Marin County is not one of these. However, information from state and federal geologic surveys has been used to develop various maps that assess susceptibility to earthquake-related hazards such as ground shaking, liquefaction, and landslides. Some of these maps are presented in Chapter 3 under Geologic Resources.

Local policies such as the LCP and the Point Reyes Station Community Plan emphasize the need for proper planning in known geologic hazard zones to "minimize risks to life and property in areas of high geologic …hazard" (LCP Section 30253). A more detailed description of state and local laws pertaining to geologic resources and hazards can be found under Geologic Resources in Chapter 3.

Under CEQA, the state and county require analysis of the impacts each alternative may have on exposing people to active or potentially active fault zones; landslides or mudslides; slope instability or ground failure; subsidence; expansive soils; liquefaction; tsunami; or similar hazards. In addition, it focuses on substantial changes in topography from excavation, grading, or fill, including, but not limited to, ground surface relief features; geologic substructures or unstable soil conditions; and unique geologic or physical features. In addition to these geologic hazards, the LCP for Zone II requires analysis of impacts to bluff areas that would diminish the stability of a bluff area or require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

General Assumptions and Methodologies

- Almost all (>90 percent) of the Project Area is located in the Alquist-Priolo Fault Zone, because the San Andreas Fault runs through the center of the Project Area in a southerly to northerly direction (Figure 19). However, the proposed project does not include construction of any habitable structures.
- Seismic Hazard Zone mapping has not been conducted for Marin County, but it is assumed that the Project Area would be mapped as a Seismic Hazard Zone or "zone of required investigation" because it incorporates the seismically active San Andreas Fault.
- All of the Project Area has been rated by the California Geological Survey as having the highest earthshaking and liquefaction potential.
- Based on its sheltered location at the very southern end of Tomales Bay, the potential for hazards associated with tsunami is assumed to be universally non-existent to negligible and, therefore, is not evaluated in this document.
- Most of the Project Area is located in the San Andreas rift valley and are lowlands or alluvial areas that are not topographically elevated or located on hillsides. A small proportion of the Project Area is located on the lower elevation portions of the coastal marine terrace that borders the Giacomini Ranch pastures to the east and the location of the town of Point Reyes Station. Hillsides within the Project Area do not exceed 35 percent or are in areas with high landslide potential, and the proposed project is not expected

to affect the potential for landslides. Therefore, the potential for hazards associated with landslides is assumed to be non-existent and, therefore, is not evaluated in this document.
- Because the Project Area does incorporate some of the coastal marine terrace on the east side of the Giacomini Ranch pastures, there is a potential for changes to bluffs along the Point Reyes Mesa terrace. Because of the importance of agriculture to West Marin and Marin County in general, a number of relevant planning documents have established policies regarding agriculture.
- The potential impacts of the proposed project on geologically related wetland functions such as groundwater discharge and recharge will be evaluated under the Water Supply and Distribution section of Public Health and Services focused impact topic, because of its pertinence to the municipal groundwater supply for the local community.

Described below are methodologies for significance criteria related to geologic resources, including any specific assumptions or details on methodologies (Tables 30-34).

TABLE 30. UNIQUE GEOLOGIC RESOURCES

Source: NPS Management Policies, Marin CEQA guidelines **Nature**: Adverse **Context**: Project Area, Region (Point Reyes/San Andreas Fault Area) **Duration**: Long-Term	
No Impact	There would be no impact to unique geologic resources associated with the proposed project in the Project Area.
Negligible	There would be a negligible impact (< 1 percent) to the areal extent of unique geologic or physical resources in the Project Area such as features associated with strike slip faults (e.g., shutter ridge, fault sag ponds, fault trenches); coastal marine terraces; or other features.
Minor	There would be a minor impact (> 1 percent and ≤ 5 percent) in the extent of unique geologic or physical resources in the Project Area such as features associated with strike slip faults (e.g., shutter ridge, fault sag ponds, fault trenches); coastal marine terraces; or other features.
Moderate	There would be a moderate impact (>5 percent and ≤ 10 percent) in the extent of unique geologic or physical resources in the Project Area such as features associated with strike slip faults (e.g., shutter ridge, fault sag ponds, fault trenches); coastal marine terraces; or other features.
Major or Substantial	There would be a substantial change (> 10 percent) in the extent of unique geologic or physical resources in the Project Area such as features associated with strike slip faults (e.g., shutter ridge, fault sag ponds, fault trenches); coastal marine terraces; or other features.

Topographic Resources: Changes in topographic resources focus on substantial changes in topography from excavation, grading, or fill, including ground surface relief features and unique physical features (Table 31). Impact thresholds focus on the extent of area affected by substantial changes in topography. There is no guidance under CEQA on how much excavation, grading, or fill constitutes a "substantial" change in topography and would, thereby, be considered significant. However, the Corps has issued some guidance for excavation in wetlands that contrasts plowing and deep ripping during agricultural operations, with plowing defined as "not to include the redistribution of surface material in a manner which converts wetlands areas to uplands [See 40 CFR 233.35(a)(1)(iii)(D)]." According to U.S. Department of Agriculture, plowing depths rarely exceed one foot into the soil and not deeper than 16 inches. In addition, guidance on changes in topographic resources can be drawn from construction standards: most grading equipment cannot accurately create or rework topography in increments of less than 0.5 feet. For the purposes of this analysis, major or substantial changes in topographic resources are considered to exceed 0.5 feet, with changes less than 0.5 feet not considered to substantially alter topography.

TABLE 31. TOPOGRAPHIC RESOURCES

Source: Marin CEQA guidelines **Nature**: Adverse **Context**: Project Area **Duration**: Long-Term	
No Impact	There would be no impact to topographic resources in the Project Area.
Negligible	There would be a negligible or barely detectable effect on topographic resources in the Project Area from excavation, grading, or fill activities resulting in topographic changes within ≤ 10 percent of the Project Area.

TABLE 31. TOPOGRAPHIC RESOURCES

Minor	There would be a minor or measurable effect on topographic resources in the Project Area from excavation, grading, or fill activities resulting in topographic changes within ≤ 25 percent of the Project Area. If areal extent of change <50 percent, change in existing elevation contours would average ≤ 0.25 feet.
Moderate	There would be a moderate or appreciable effect on topographic resources in the Project Area from excavation, grading, or fill activities resulting in topographic changes within ≤ 50 percent of the Project Area. If areal extent of change > 50 percent, change in existing elevation contours would average ≤ 0.5 feet.
Major or Substantial	There would be a substantial or major effect on topographic resources in the Project Area from excavation, grading, or fill activities resulting in topographic changes within > 50 percent of the Project Area, and change in existing elevation contours would average > 0.5 feet.

Geologic Hazards – Surface Fault Rupture: Because the Park Service Management Policies (2001), LCP Zone II Policies (1981), Coastal Resource and Management Policies, and Marin CWP policies stress the importance of minimizing risk to people and property, the potential risk to visitors and residents is evaluated by the number of habitable and non-habitable structures in the Alquist-Priolo Fault Zone within the Project Area (Table 32). While the Alquist-Priolo Fault Zone Mapping Act focuses exclusively on habitable structures, both non-habitable and habitable structures would attract people to the Project Area and potentially increase the risk to public safety should an earthquake occur on the San Andreas Fault, particularly in the generalized vicinity of the Project Area (i.e., within at least 10 to 50 miles of the epicenter). As noted earlier, the San Andreas Fault runs directly through the Project Area. Most of the risk with surface fault ruptures is associated with structures that either straddle or are in close proximity (within 50 feet) to an active fault. Hazards associated with surface fault rupture typically decrease exponentially with distance from an active fault such as the San Andreas Fault. "Most surface faulting is confined to a relatively narrow zone a few feet to tens of feet wide, making avoidance (i.e., building setbacks) the most appropriate mitigation method" (California Geological Survey 2002). However, in some cases, "primary fault rupture along branch faults can be distributed across zones hundreds of feet wide or manifested as broad warps," which suggests that engineering strengthening or design may be of additional mitigative value (California Geological Survey 2002). Hazards associated with surface fault rupture are also governed by soil substrate, with bedrock magnifying the impact of surface fault ruptures. Lastly, hazards associated with a surface fault rupture are strongly related to the potential for a large earthquake. The probabilities of an earthquake with a magnitude greater than 6.7 between 2000 and 2030 are 21 percent for the San Andreas Fault.

For this analysis, it is assumed that any structure in the fault zone would potentially attract people to a known hazard zone and increase the risk to public safety, even if it is not habitable. Impact thresholds are based on the number of structures proposed under the various alternatives, along with the distance from the fault, because hazards associated with surface fault rupture generally decrease rapidly with distance from an active fault. Impact thresholds were developed on the assumption that the Project Area is not located on bedrock soils, which are associated with magnification of fault rupture impacts. Non-habitable structures evaluated were defined as buildings, including Visitor Centers, bathrooms, and other constructed structures (e.g., education centers, youth hostels) that are open for public use, as well as constructed features of trails such as bridges. Analysis takes into account construction of structures such as bridges as part of the public access component, as well as the potential for the proposed project to increase use of existing structures.

TABLE 32. SURFACE FAULT RUPTURE HAZARDS

Source: NPS Management Policies, Alquist-Priolo Fault Zone Mapping Act (state); CCC/LCP Zone II, Marin CWP **Nature**: Adverse **Context**: Project Area **Duration**: Long-Term	
No Impact	There would be no structures within the Project Area that would attract people to a known hazard area.
Negligible	Habitable structures or a moderate to high number (>1) of non-habitable structures (e.g., centers, bathrooms, bridges) would be at a considerable distance from an active fault (>500 feet); ***OR*** A low number (≤1) of non-habitable structures would be within 100 to 500 feet of an active fault.
Minor	Habitable structures or a moderate to high number (>1) of non-habitable structures (e.g., centers, bathrooms, bridges) would be within 100-500 feet from an active fault; ***OR*** A low number (≤1) of non-habitable structures would be within 50 to 100 feet of an active fault.

TABLE 32. SURFACE FAULT RUPTURE HAZARDS

Moderate	Habitable structures or a moderate to high number (>1) of non-habitable structures (e.g., centers, bathrooms, bridges) would be within 50-100 feet from an active fault; ***OR*** A low number of non-habitable structures (≤1) would be within 5 to 100 feet of an active fault.
Major or Substantial	Non-exempt habitable structures would be across or within 50 feet of an active fault; ***OR*** Non-habitable structures (e.g., centers, bathrooms, bridges) would be placed astride or across an active fault trace.

Geologic Hazards – Groundshaking and Liquefaction: Because Park Service Management Policies (2001), LCP Zone II Policies (1981), Coastal Resource and Management Policies, and Marin CWP policies stress the importance of minimizing risk to people and property, the potential risk to visitors and residents from groundshaking and liquefaction is evaluated by the number of structures, facilities, and uses that would attract people to the Project Area, a known hazard area, and potentially increase risk to public safety (Table 33). Hazards associated with groundshaking or liquefaction do not typically decrease as rapidly with distance from an active fault as those associated with surface fault rupture and are more strongly affected by other confounding factors such as soil substrate (i.e., mud versus rock) that can amplify shaking. Based on the scale of the Project Area and the relative homogeneity of the soil substrate, it is assumed that the potential for earthquake shaking and liquefaction does not vary measurably and is the same for the entire Project Area as shown in the California Geological Survey maps. As with surface fault rupture, potential hazards associated with groundshaking and liquefaction are strongly related to the potential for a large earthquake. The probabilities of an earthquake with a magnitude greater than 6.7 between 2000 and 2030 are 21 percent for the San Andreas Fault. The average length of an earthquake is 40 seconds (R. Grasetti, GeoCon, *pers. comm*.).

The number of structures, facilities, and attractions/uses proposed or envisioned under each of the various alternatives has been ranked as low, moderate, and high based on a relative comparison with the total number of structures, facilities, and attractions/uses currently present in specific destination areas or points in the park (e.g., Tomales Point, Bear Valley, Olema Valley, Limantour, etc.). This ranking system incorporates not only physical structures such as Visitor's Centers and bathrooms, but non-structural attractions/uses, as well, such as bird-watching, kayaking, backpacking, bicycle riding, swimming, and viewpoints. A more detailed description of the system for ranking structures, facilities, and attractions/uses can be found under Visitor and Resident Experience in Chapter 3. Because groundshaking and liquefaction hazards are expected to be universally very high throughout the Project Area, impact thresholds do not include distance from an active fault. This analysis focuses on the number of structures and facilities that would be constructed or operated under Park Service and CSLC lands as part of the proposed project in high to very high hazard zones. In addition, the number of people expected to potentially utilize public access resources in the Project Area vicinity is incorporated into the analysis, using a relatively broad ranking system of low, moderate, and high based on a relative comparison of daily numbers of people visiting other subregions or destinations within the Seashore and north district of the GGNRA. This ranking system is also discussed in more detail under Visitor and Resident Experience in Chapter 3. In assessing risk to public safety, impact thresholds take into account the low probability of a major earthquake along the San Andreas Fault in the vicinity of the Project Area and the short duration of actual earthquake episodes.

TABLE 33. GROUNDSHAKING AND LIQUEFACTION HAZARDS

Source: NPS Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Adverse **Context**: Project Area **Duration**: Long-Term	
No Impact	There would be no structures, facilities, or uses located in high hazard zones within the Project Area vicinity that would attract people to a known hazard area.
Negligible	There would be only a low number (≤25) of structures, facilities, or attractions/uses located in high hazard zones within the Project Area vicinity that would collectively attract low average numbers (<250 daily) of people to a known hazard area.
Minor	There would be a low number (≤25) of structures, facilities, and attractions/uses located in high hazard zones within the Project Area vicinity that would collectively attract moderate to high average numbers (≥250 daily) of people to a known hazard zone; ***OR*** A moderate to high number (>25) of structures, facilities, and attractions/uses located in high hazard zones

TABLE 33. GROUNDSHAKING AND LIQUEFACTION HAZARDS

	within the Project Area vicinity that would be expected to collectively attract low average numbers (<250 daily) of people to a known hazard area.
Moderate	There would be a moderate number (>25 and ≤40) of structures, facilities, and attractions/uses located in high hazard zones within the Project Area vicinity that would collectively attract moderate to high average (≥250 daily) numbers of people; ***OR*** A high number of structures, facilities, and attractions/uses (>40) located in high hazard zones within the Project Area vicinity that would be expected to collectively attract moderate average numbers (<1,000 daily) of people to a known hazard area.
Major or Substantial	There would be a moderate number of structures, facilities, and attractions/uses (> 25 and ≤ 40) that would collectively attract very high average numbers (>1,500 daily) of people; ***OR*** A high number of structures, facilities, and attractions/uses (> 40) that would be expected to collectively attract high to very high average numbers (≥ 1,000 daily) of people to a known hazard area.

Geologic Hazards – Coastal Bluff Stability: LCP Zone II Policies (Marine County Comprehensive Planning Department 1981) require project proponents to ensure that proposed projects would not diminish the stability of a bluff area through development, construction of protective devices, or other factors (Table 34). Within the Project Area, bluffs have been identified in the LCP in Point Reyes Station directly adjacent to the Giacomini Ranch East Pasture.

TABLE 34. COASTAL BLUFF STABILITY

Source: CCC/LCP Zone II **Nature**: Adverse **Context**: Project Area **Duration**: Long-Term	
No Impact	There would be no impact to bluffs associated with implementation of the proposed project.
Negligible/ Minor/ Moderate	The proposed project would affect bluffs, but would NOT develop bluffs or violate the bluff-related policies in the LCP Plan.
Major or Substantial	The proposed project would affect bluffs and would violate the bluff-related policies of the LCP Plan.

Impact Analysis

TABLE 35. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR GEOLOGIC RESOURCES

All impacts are Adverse unless stated otherwise and Project Area and are assumed to be uniform for all duration periods (Construction/Short-Term/Long-Term) unless otherwise noted.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Unique Geologic Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Topographic Resources	Beneficial - Negligible	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Moderate
Geologic Hazards – Surface Fault Rupture and Impacts on Public Safety	No Impact	Minor	Minor	Minor	No Impact
Geologic Hazards – Groundshaking and Liquefaction and Impacts on Public Safety	Negligible	Minor	Minor	Minor	Minor
Coastal Bluff Stability	No Impact	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor	Negligible/ Minor

No Action Alternative

Analysis: The impacts for the No Action Alternative on geologic and topographic resources and geologic hazards would generally range from negligible adverse to negligible beneficial (Table 35).

Geologic Resources and Coastal Bluff Stability: There are no unique geologic resources within the Project Area. While the San Andreas Fault does run through the Project Area, the best opportunities for geologists and non-geologists to view the fault and fault-associated features occur in the Olema Valley, which is a frequent destination for geology-associated field trips. There would be no potential to impact to coastal bluff stability under this alternative.

Topographic Resources: This alternative would result in only negligible impacts to topographic resources associated with the approximately 11 acres of restoration that would be performed to comply with the Park Service's existing mitigation agreement with CalTrans. This agreement transferred mitigation obligations for wetland impacts caused by CalTrans on Highway 1 in Marin County to the Park Service in exchange for monies to purchase the Giacomini Ranch. Construction of the restoration component would affect topographic resources within a very minor portion of the Project Area (< 2 percent) and would result, on average, in changes in existing topographic contours or elevations of much less than 0.25 feet (<0.05 feet; Table 36). Because this component would involve restoring wetlands through removal of fill, the effects on topographic resources would be characterized as beneficial.

TABLE 36. TOPOGRAPHIC RESOURCES: EXTENT OF AREA WITH TOPOGRAPHIC CHANGES AND AVERAGE CHANGE IN EXISTING ELEVATION CONTOURS

This includes excavation, fill, scraping, and loose spreading of excavated soils .

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator					
Approximate Extent of Area with Topographic Changes	<2 %	53%	76%	90%	95%
Average Change in Existing Elevation Contours	<0.05	<0.05	<0.25	<0.25	<0.5

Geologic Hazards: In terms of geologic hazards, there would be no potential impact to public safety related to surface fault rupture, because no construction of habitable or non-habitable structures would occur under this alternative. Potential impacts to public safety relating to groundshaking and liquefaction would be negligible compared to baseline conditions despite the fact that the Project Area is rated as potentially being subject to the highest liquefaction and groundshaking rates or impacts. Based on California Geological Survey hazard maps, potential Impacts from liquefaction would be restricted to those structures and facilities constructed or operated in lowland or alluvial valley portions of the Project Area, while groundshaking impacts would extend to those structures and facilities constructed or operated along the Point Reyes Mesa terrace and along the low hill or shutter ridge on the east side of Olema Marsh.

This alternative would not involve construction of new public access structures and facilities, but there would be continued use of existing public access facilities. This alternative would have a relatively low number of public access-related structures, facilities, and attractions/uses (26) that would occur in high hazard zones, identical to baseline conditions. The total or collective number of people projected to use these structures and facilities on a daily basis would be expected to continue to be low relative to visitation rates for major destination areas or points within the Seashore and north district of the GGNRA, although numbers may climb slightly with closure of the dairy and assumption of full management of the Giacomini Ranch by the Park Service. Therefore, the low number of public access facilities and projected users, combined with the low probability of a major earthquake along the San Andreas Fault in the vicinity of the Project Area, would suggest that potential impacts from this alternative would be negligible relative to baseline conditions.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There is only one project that would potentially have a cumulative impact should the No Action alternative be implemented. The proposed Bear Valley Creek Watershed Enhancement Project would replace undersized or otherwise hydraulically limiting stream crossing infrastructure in the middle and upper portions of the watershed. Changes in erosion or sedimentation patterns resulting from this project could have cumulative effects on topographic resources through changing sediment transport patterns in the subwatershed, patterns of deposition and erosion, leading to even further increases in marsh surface elevation. Because of the flat gradient through lower Bear Valley Creek and Olema Marsh, the Bear Valley

Creek project is unlikely to increase erosion rates. Therefore, cumulative impacts on topographic resources would be considered to be potentially adverse, though minor in intensity. Other than the Bear Valley Creek project, there are no currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts in the Giacomini Ranch should the No Action Alternative be implemented.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of the No Action alternative on geologic and topographic resources and geologic hazards would generally range from negligible adverse to negligible beneficial (Table 35). This alternative would result generally in either no to negligible impacts on unique geologic and topographic resources and potentially no to minor impacts on public safety associated with operation of public access structures and facilities in known hazard zones within the Project Area. While the Project Area is located in a geologically volatile area, the San Andreas Fault Zone, the probability of a major earthquake in the vicinity of the Project Area is low, and the total or collective number of people projected to use public access facilities on a daily basis is also low relative to visitation rates for other major destination areas or points within the Seashore and north district of the GGNRA.

Alternative A

Analysis: The impacts of Alternative A on geologic and topographic resources and geologic hazards would generally range from have minor adverse to minor beneficial (Table 35).

Geologic Resources and Coastal Bluff Stability: As discussed under No Action, there are no easily viewable unique geologic resources within the Project Area that would be affected by the proposed project, and the Project Area does not represent the best viewing opportunities for the fault and fault-associated features. This alternative would affect bluffs through removal of invasive vegetation, but slopes would be revegetated with native vegetation, so these activities would not develop bluffs or violate the bluff-related policies in the LCP Plan. Therefore, this alternative would have only a negligible/minor/moderate effect on coastal bluff stability.

Topographic Resources: This alternative would result in minor impacts to topographic resources. There would be varying degrees of sediment excavation and fill in the Giacomini Ranch East Pasture associated with removal of levees and other agricultural infrastructure, excavation of manure disposal areas and tidal channels, grading of creek banks, filling of drainage ditches and manure ponds, spreading of excess excavated material, creation of trails and viewing areas and platforms, and construction of a bridge. There would be no restoration or public access constructed under this alternative in the Giacomini Ranch West Pasture or Olema Marsh, with the possible exception of the possible future extension of the southern perimeter trail to Inverness Park. The possible future trail extension to Inverness Park could involve widening of the Sir Francis Drake Boulevard road berm through placement of fill by as much as 5 feet in areas, which would change existing topographic resources considerably. While approximately 53 percent of the Project Area would be affected, changes in existing topographic contours would average less than 0.25 feet (<0.05 feet; Table 36). Most of the intensive excavation and fill activities (> 1.0 foot) are concentrated within a relatively small area (~ 9 percent) of the East Pasture, with shallow redistribution (~0.1 feet – 0.25 feet) of excess excavated sediments over much larger portions of the East Pasture accounting for most of the changes to existing topographic elevation contours in the East Pasture. This redistribution or loose spreading of excavated sediment is intended to be as shallow as possible to minimize any buildup in elevations that could affect establishment of intertidal or salt marsh communities. Because restoration actions focus on restoring historic marsh conditions prior to diking, changes in topographic resources proposed under this alternative are characterized as beneficial.

Over the long term, topographic resources would continue to undergo changes in the East Pasture, because removal of levees would increase exposure to flood flows, which can alter topography through successive episodes of erosion and sediment deposition. Since the 1860s and the massive influx of sediment that extended the Lagunitas Creek delta considerably out into Tomales Bay, the dominant forces shaping the Project Area have shifted from tidal ones to fluvial or river/creek ones (KHE 2006a). This shift is evident in the absence of complex, highly sinuous tidal creek channels depicted in the 1860s map, the formation of alluvial levees, and the flood-scarred landscape of the southern portion of the East Pasture in the 1940s as documented in aerial photographs taken prior to installation of the levees. The Project Area occurs in a very

dynamic hydrologic zone at the confluence of three major creeks where topographic resources are expected to be actively reworked by storm events.

Sediment deposition can, over time, lead to an increase in vertical elevations of the floodplain that could tilt evolutionary trajectory trends towards establishment of uplands. However, within naturally dynamic systems such as estuaries, these trends are often counterbalanced by sea level rise and subsidence (either compaction- or fault-associated) that act to maintain or regenerate wetlands even within depositional environments. Predicted rates of sea level rise over the next century vary greatly, with recent estimates calling for a substantial increase, but, even using conservative estimates such as somewhere less than 3 feet, the northern two-thirds of the East Pasture would become submerged, leaving only the southern one-third above water. This dramatic change in tidal influence would, in essence, result in tidal influences once again being the dominant force shaping the southern Tomales Bay landscape, much as they did in the 1860s.

Geologic Hazards: In terms of geologic hazards, there would be a potential minor impact to public safety related to surface fault rupture, because construction of non-habitable structures within 100-300 feet of the San Andreas Fault would occur under this alternative. The southern perimeter trail proposed in the Project Area would cross Lagunitas Creek using a bridge that would be approximately 150 feet from the San Andreas Fault. In addition, connecting the East Pasture of Giacomini Ranch to the existing trail in White House Pool County Park could increase use of the White House Pool trail, and there is a very small bridge over the existing Bear Valley Creek channel that is approximately 118 feet from the fault. The Alquist Priolo Fault Zone Mapping Act strongly discourages construction of habitable structures on or within 50 feet of an active fault and requires local agencies to strictly regulate construction of any kind in fault zones. While risks associated with non-habitable structures are less than habitable ones, potential impacts to public safety can still occur if non-habitable structures are located on or near an active fault. In this case, the risk to public safety would be very minor, because the structures are non-habitable and located more than 100 feet from the fault and that the soils are alluvial and less likely to magnify the impact of any earthquake that may occur. In addition, despite the proximity of the San Andreas Fault, the probability of a large earthquake in the vicinity of the Project Area is relatively low.

Potential impacts to public safety relating to groundshaking and liquefaction would be minor despite the fact that the Project Area is rated as having the highest liquefaction and groundshaking potential. As discussed under the No Action Alternative, potential impacts from liquefaction would be restricted to those structures and facilities constructed or operated in lowland or alluvial valley portions of the Project Area, while groundshaking impacts would extend to those structures and facilities constructed or operated along the Point Reyes Mesa terrace and along the low hill or shutter ridge on the east side of Olema Marsh. This alternative would involve both construction of new public access structures and facilities, as well as continued operation and use of existing facilities. While this alternative had a high number of public access-related structures, facilities, and attractions/uses (42) that would occur in high hazard zones, the average number of people projected to collectively use all the public access facilities within the Project Area vicinity is low (<150 people daily) relative to visitation rates for other public access facilities within major destination areas or points of the Seashore and north district of the GGNRA. Therefore, the low number of users, combined with the low probability of a major earthquake along the San Andreas Fault in the vicinity of the Project Area, would suggest that potential impacts from this alternative would be minor. There would be no potential to impact to coastal bluff stability under this alternative.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of Alternative A on geologic and topographic resources and geologic hazards would generally range from have minor adverse to minor beneficial (Table 35). Alternative A would have no impacts on unique geologic resources and minor beneficial effects on topographic resources, because changes in topographic resources would involve primarily the removal of fill to restore historic marsh conditions with

the exception of the eastern perimeter trail and the possible future extension of the southern perimeter trail to Inverness Park. There would be potential minor adverse impacts on public safety related to geologic hazards associated with construction and/or operation of public access structures and facilities in known hazard zones within the Project Area. While the Project Area is located in a geologically volatile area, the San Andreas Fault Zone, the probability of a major earthquake in the vicinity of the Project Area is low, and the total or collective number of people expected to use public access resources in the Project Area vicinity is also low relative to visitation rates for other major destination areas or points within the Seashore and north district of the GGNRA.

Alternative B

Analysis: Alternative B would generally have similar impacts to Alternative A, with impacts ranging in intensity from minor adverse to minor beneficial (Table 35).

Geologic Resources, Geologic Hazards, and Coastal Bluff Stability: As discussed under Alternative A, there would be no impact to unique geologic resources, and geologic hazard and coastal bluff stability impacts would be identical to those discussed under Alternative A.

Topographic Resources: As with Alternative A, this alternative would result in minor impacts to topographic resources in both the Giacomini Ranch East and West Pastures. There would be varying degrees of sediment excavation and fill in the East and West Pastures associated with removal of levees and other agricultural infrastructure, excavation of manure disposal areas and tidal channels, grading of creek banks, filling of drainage ditches, borrow ditches and manure ponds, spreading of excess excavated material, creation of trails and viewing areas and platforms, and construction of a bridge. There would be no restoration or public access constructed under this alternative in the Olema Marsh. While approximately 76 percent of the Project Area would be affected, changes in existing topographic contours would still average less than 0.25 feet (Table 36). Most of the intensive excavation and fill activities (> 1.0 foot) are concentrated within a relatively small area (~ 9 percent) of the East Pasture and, to a much lesser degree, the West Pasture, with shallow (< 0.1 feet - 0.25 feet) redistribution of excess excavated sediment over much larger portions of the ranch accounting for most of the changes to existing topographic elevation contours. This redistribution or loose spreading of excavated sediment is intended to be as shallow as possible to minimize any buildup in elevations that could affect establishment of intertidal or salt marsh communities. One of the potential mitigation measures for flooding would involve possible construction of a levee or levees around private properties on the east side of Sir Francis Drake Boulevard in Inverness Park, specifically lower elevation properties that would be potentially more subject to flooding. This could involve placement of approximately 2-3 vertical feet of fill in existing pastures along private property boundaries. In Alternative B, both the East and West Pastures would be subject to flood flows that would alter topography through erosion and sediment deposition, as well as vulnerable to sea level rise.

Because restoration actions focus primarily on restoring historic marsh conditions prior to diking, changes in topographic resources proposed under this alternative would be characterized as beneficial. Earthmoving associated with public access would be greatly reduced under Alternative B relative to Alternative A, because the eastern perimeter trail would involve construction of a boardwalk rather than importation of fill for a culverted dirt trail. However, as part of the possible future extension of the southern perimeter trail to Inverness Park, there would still be the potential for placement of fill to widen the Sir Francis Drake Boulevard road berm by as much as 5 feet in areas, which would change existing topographic resources considerably.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative B would generally have similar impacts to Alternative A, with impacts ranging in intensity from minor adverse to minor beneficial (Table 35). Alternative B would have no impacts on unique geologic resources and minor beneficial effects on topographic resources, because changes in topographic resources would involve primarily the removal of fill to restore historic marsh conditions with the exception of the possible future extension of the southern perimeter trail to and construction of levees around lower-elevation homes on the east side of Sir Francis Drake Boulevard in Inverness Park. There would be potential minor adverse impacts on public safety related to geologic hazards associated with construction and/or operation of public access structures and facilities in known hazard zones within the Project Area. While the Project Area is located in a geologically volatile area, the San Andreas Fault Zone, the probability of a major earthquake in the vicinity of the Project Area is low, and the total or collective number of people expected to use public access resources in the Project Area vicinity is also low relative to visitation rates for other major destination areas or points within the Seashore and north district of the GGNRA. This alternative would affect bluffs through removal of invasive vegetation, but slopes would be revegetated with native vegetation, so these activities would not develop bluffs or violate the bluff-related policies in the LCP Plan.

Alternative C

Analysis: Alternative C would generally have very similar impacts to Alternative B, with a few exceptions (Table 35).

Geologic Resources, Geologic Hazards, and Coastal Bluff Stability: Similar to Alternatives A and B, Alternative C would have no impacts on unique geologic resources and negligible/minor/moderate impacts on coastal bluff stability. There would be potential minor adverse impacts on public safety related to geologic hazards associated with construction and/or operation of public access structures and facilities in known hazard zones within the Project Area.

Topographic Resources: This alternative would result in moderate impacts on topographic resources in the Giacomini Ranch East and West Pastures and Olema Marsh. There would be varying degrees of sediment excavation and fill in the Giacomini Ranch associated with removal of levees and other agricultural infrastructure, excavation of manure disposal areas and tidal channels, grading of creek banks, filling of drainage ditches, borrow ditches and manure ponds, spreading of excess excavated material, creation of trails and viewing areas and platforms, and construction of a bridge. In addition, in Olema Marsh, there would be excavation of a small berm and a more defined creek channel, as well as potentially future replacement of one or both of the Levee Road and Bear Valley Road culverts through an adaptive restoration approach.

Under this alternative, the extent of area affected by changes in existing topographic contours would increase from approximately 76 percent under Alternative B to approximately 90 percent under Alternative C (Table 36). In general, changes in existing topographic contours would remain less than 0.25 feet under Alternative C, similar to Alternatives A and B (Table 36). The extent of area affected by intensive excavation and fill (> 1.0 foot) activities would climb from approximately 9 percent under Alternative B to 16 percent of the Project Area, with shallow (< 0.1 feet - 0.25 feet) redistribution of excess excavated sediment spread over a larger portion of the ranch relative to Alternatives A and B. This redistribution or loose spreading of excavated sediment is intended to be as shallow as possible to minimize any buildup in elevations that could affect establishment of intertidal or salt marsh communities. As with Alternative B, there would still be the potential for construction of a levee or levees around lower-elevation private properties on the east side of Sir Francis Drake Boulevard in Inverness Park as a possible flood control–related mitigation measure (see Public Health and Safety – Flooding). This could involve placement of approximately 2-3 vertical feet of fill in existing pastures along private property boundaries.

Most of the increase in intensive excavation or fill under Alternative C comes from projected impacts to topography associated with excavation of the small berm near the mouth of Bear Valley Creek in Olema Marsh and possible future replacements of the culverts. The small berm at the mouth of Bear Valley Creek adjacent to Levee Road, along with culvert under Levee Road, appear to be substantially limiting drainage of Bear Valley Creek waters that flow under Bear Valley Road into Olema Marsh (KHE 2006a). Poor drainage has converted Olema Marsh into an extensive vegetated and open water pond with an essentially flat water surface slope and almost no gradient, and there is some evidence that water levels are continuing to increase over time (KHE 2006a). Under this alternative, a small berm in the marsh that strongly limits drainage of waters into Bear Valley Creek would be removed, and the Bear Valley Creek channel, which is currently choked with vegetation in Olema Marsh, would be shallowly excavated to improve the hydraulic flow gradient. In future years, should these restoration actions not appear to lead to the desired degree of restoration, the

Park Service, CSLC, and Audubon Canyon Ranch (ACR) would consider replacement of the culverts at Levee Road or Bear Valley Road or both culverts.

Because excavation and/or culvert replacement would be expected to substantially improve hydraulic connectivity of Olema Marsh and Lagunitas Creek and decrease drainage of ponded waters, water surface elevations within Olema Marsh would drop, exposing the thick layer of peat or organic rich-soils to air. Aeration of the underlying peat materials would cause rapid decomposition or breakdown of organic materials, which would start to drop the topographic surface elevation of the marsh relative to existing topographic conditions. The expected range of water surface level change would range from 4 feet with removal of the berm and shallow excavation of the channel up to 6 feet with replacement of the Levee Road culvert (KHE 2006a). Excavation of the berm and channel and replacement of the culverts would decrease permanently impounded areas in Olema Marsh from 37.4 acres to 16 to 2.2 acres (KHE 2006a), thereby leaving the remainder of the marsh vulnerable to oxidation and marsh surface subsidence. In Connecticut, a lowering of the water table by almost 3 feet following draining of ponded waters resulted in rapid decomposition and loss of peat, causing the marsh surface to drop or subside by at least 2 feet relative to its former elevation (Rozsa 1997). Marsh surface elevations are approximately 1- 2 feet higher than the culvert invert elevation, which suggests that compaction could range anywhere from 1 to 4.5 feet depending on the adaptive restoration elements implemented. The adaptive restoration approach proposed would enable changes in surface topography to occur more gradually than if all the proposed restoration elements were implemented simultaneously.

Ultimately, this change in existing topographic conditions, as with the changes in Giacomini Ranch, would be considered beneficial, because increases in water surface levels -- and potentially surface elevations through continual build-up of undecomposed peat material -- continues to drive Olema Marsh even further away from its historic condition as an intertidal marsh, with water and ground surface elevations currently precluding almost all tidal influence. More information on the hydrologic, biogeochemical, and biological effects of this change in drainage and water impoundment conditions is presented in subsequent sections of this chapter. Over the long-term, subsidence leaves the marsh more vulnerable to sea level rise, but, to some extent, the levee and culvert system would provide a buffer that might slightly reduce impacts.

Several other changes occur under Alternative C relative to Alternative B. One is that, for California red-legged frog mitigation purposes, several ponds totaling approximately 2 acres in size would be created in the adjacent Olema Creek watershed. Excavation in this area would vary and range from less than 1.0 foot to several feet in depth to create depressional features with various ponding depths. The second is that, if the Levee Road culvert was replaced through adaptive restoration, the existing bridge over the Bear Valley Creek outlet would need to be replaced with either a pedestrian causeway along Levee Road or a new bridge closer to Lagunitas Creek. As with the old bridge, the new bridge or causeway would be within approximately 125 feet of the San Andreas Fault trace.

Possible Additional Mitigation Measures: No mitigation measures are proposed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: As was discussed under the No Action Alternative, there is at least one project that could potentially cause cumulative impacts with the proposed project. The proposed Bear Valley Creek Watershed Enhancement Project would replace undersized or otherwise hydraulically limiting stream crossing infrastructure in the middle and upper portions of the watershed. Changes in erosion or sedimentation patterns resulting from this project could have cumulative effects on topographic resources through changing sediment transport patterns in the subwatershed, patterns of deposition and erosion. Should the Bear Valley Creek project increase sediment transport to the lower reaches of Bear Valley Creek, subsidence within Olema Marsh induced by oxidation could be tempered to some degree. Because of the flat gradient through lower Bear Valley Creek and Olema Marsh, the Bear Valley Creek project is unlikely to increase erosion rates. Therefore, cumulative impacts on topographic resources under Alternative C from the Bear Valley Creek Watershed Enhancement Project would be considered to be beneficial and minor to moderate in intensity. Other than the Bear Valley Creek project, there are no currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts in the Giacomini Ranch should Alternative C be implemented.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in

enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Impacts under Alternative C would be generally similar to those under Alternative B, with a few exceptions. Similar to Alternatives A and B, Alternative C would have no impacts on unique geologic resources, and there would be potential minor adverse impacts on public safety related to geologic hazards associated with construction and/or operation of public access structures and facilities in known hazard zones within the Project Area. The most apparent change in Alternative C relative to Alternative B is the appreciable increase in areal extent of changes in topographic conditions, as well as the extent of area that would be subjected to more intensive excavation and fill activities (> 1.0 foot). Most of this increase would come from changes in Olema Marsh, which would subside as a result of improved hydraulic connectivity and drainage of waters afforded by the proposed restoration activities, as well as possible construction of levees to protect private property. The adaptive restoration approach proposed could result in anywhere form 0.66 to 3 feet of surface elevation lowering or subsidence from oxidation and decomposition of extensive peat material present in Olema Marsh. This alternative would affect bluffs through removal of invasive vegetation, but slopes would be revegetated with native vegetation, so these activities would not develop bluffs or violate the bluff-related policies in the LCP Plan. Therefore, this alternative would have only a negligible/minor/moderate effect on coastal bluff stability.

Alternative D

Analysis: Alternative D would generally have very similar impacts to Alternative C, except for potential impacts to public safety associated with surface fault rupture (Table 35).

Geologic Hazards: This alternative would have no potential impacts to public safety associated with geologic hazards such as surface fault rupture, because no bridge would be constructed along the southern perimeter of the Giacomini Ranch as part of the public access component. There would be no potential changes in topographic resources associated with public access, because there would be no through-trail component on the eastern perimeter or future extension of the southern perimeter trail to Inverness Park. Visitation rates could increase slightly in White House Pool County park, simply because of public interest in viewing the restoration project, but these increases would be low enough that they would probably not be detectable.

Topographic Resources: Potential impacts to existing topographic resources would still be characterized as moderate for restoration and public access components in the Giacomini Ranch East and West Pastures and Olema Marsh. The largest change in Alternative D relative to Alternative C is some limited grading in the southwestern portion of the East Pasture to bring the higher elevation areas down to intertidal elevations that would be affected by tides either daily or on higher high tides.

Under this alternative, the extent of area affected by changes in existing topographic contours would increase slightly from approximately 90 percent under Alternative C to approximately 95 percent under Alternative D (Table 36). Changes in existing topographic contours would average slightly higher than Alternative C, but still be less, on average, than 0.5 feet (Table 36). The extent of area affected by intensive excavation and fill (> 1.0 foot) activities would remain similar under Alternative D to Alternative C, because, while the areal extent of excavation would increase, the revised approach under the FEIS/EIR involves less changes to existing topographic contours with excavation depth not to exceed more than 1 foot. As with Alternatives B and C, there would still be the potential for construction of a levee or levees around lower-elevation private properties on the east side of Sir Francis Drake Boulevard in Inverness Park as a possible flood control–related mitigation measure (see Public Health and Safety – Flooding). Because restoration actions focus on removing fill and other legacies of 60 years of agricultural management, changes in topographic resources proposed under this alternative are characterized as beneficial.

Possible Additional Mitigation Measures: No additional mitigation measures would be proposed.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would the same as discussed under Alternative C.

Conclusions: Alternative D would generally have very similar impacts to Alternative C, except for potential impacts to public safety associated with surface fault rupture (Table 35). Similar to Alternative C, this alternative would have no impact on unique geologic resources; negligible/minor/moderate impacts on coastal

bluff stability; beneficial moderate effects on topographic resources, and potential minor adverse impacts to public safety associated with geologic hazards such as groundshaking and liquefaction. The most substantial change in Alternative D relative to Alternative C is the removal of the bridge under the public access component, which reduces, if not eliminates, potential threats to public safety from geologic hazards such as surface fault ruptures. The other change is the excavation of the southeastern portion of the East Pasture to intertidal elevations, which causes a slight increase in areal extent and average depth of fill or excavation relative to Alternative C.

Soil Resources

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Soils are regulated either as a unique resource or a possible source of contamination. Soils that are believed to have high value for agriculture are seen as a unique resource and are subject to the federal Farmland Protection Policy Act (FPPA). Highly publicized efforts to clean up Superfund sites and landfills over the past 30 years underscore how soils can also become a source of contamination and a hazard to public health. In general, sediment contamination is linked for regulatory purposes to water quality under Section 401 and Section 303(d) of the Clean Water Act. The San Francisco RWQCB has standards for turbidity or the amount of suspended sediment in waters, and suspended sediment often is bound to nutrients, pathogens, and contaminants such as mercury. The Basin Plan (RWQCB 1995a) requires that the suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

In addition, "controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life" (RWQCB 1995a). Should soil contamination reach high enough levels, federal legislation such as the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq. --

1976) and Comprehensive Environmental Response, Compensation, and Liability Act (42 (U.S.C. 9601 et seq. -- 1980), also known as Superfund, are triggered, which regulate transport and disposal of hazardous waste and require clean-up of toxic areas. While not directly regulated, soils can also become a contaminant source through uptake of extremely high levels of nutrients from activities such as concentrated cattle or horse grazing or manure spreading. These nutrients can later be potentially released from soils to surface or ground waters through erosion, resuspension of bound forms back into solution, and/or release of nitrogen through volatilization to the atmosphere.

Significance criteria developed by the state and county for CEQA mainly focus on the potential for erosion or siltation through wind and water forces, the latter of which is addressed under Water Resources.

General Assumptions and Methodologies

- Impacts to Prime and Unique Farmland Resources are evaluated under the Land Use and Planning – Agricultural Land Use section.
- Potential water quality impacts in the Project Area or watershed associated with erosion of soils or flux of nutrient or contaminants from soils into overlying surface waters during and shortly after construction, as well as over the long-term, are evaluated under Water Resources – Water Quality focused impact topic.
- Changes in the quality of sediments in the Project Area associated with implementation of the proposed project are assessed separately for 1) nutrients (assumed to be a combination of nitrates, ammonium, and phosphates) and 2) contaminants (principally metals).
- Short-Term under this impact topic refers to a period of approximately 10 years.

Described below are methodologies for impact indicators related to soils resources, including any specific assumptions or details on methodologies used to develop impact thresholds (Tables 34-35).

Sediment Quality – Nutrients: While nutrient dynamics in Tomales Bay is largely driven by loading from upstream portions of the watershed, the quality of the sediment in most of the Project Area is currently affected primarily by agricultural management practices such as cattle grazing and varying degrees of manure spreading within the pastures. With restoration, these soils could be subject to erosion and transported downstream into Lagunitas Creek and the southern portion of Tomales Bay. Because there are no specific regulations regarding nutrient concentrations in sediment despite its potential to affect water quality through

erosion or release or flux of nutrients from soils into overlying waters, analysis relies on establishing a relatively broad range of impact thresholds in sediment quality conditions using baseline data collected on sediments in the Project Area (NPS, unpub. data; Table 37). Impact thresholds are based on the natural range of variability in nutrient concentrations (specifically total organic and inorganic nitrogen or TKN) observed in baseline or reference wetlands, lightly managed pastures with cattle grazing but no manure spreading, heavily managed pastures with higher levels of cattle grazing and light manure spreading, and pastures repeatedly subjected to heavy manure spreading. TKN (inorganic and organic nitrogen) was selected as the representative nutrient parameter, because TKN does not vary as widely over short time scales as do other nutrient parameters such as nitrates (J. Callaway, wetlands ecology professor, University of San Francisco, *pers. comm*.).

Changes in soil nutrient concentrations were not modeled for the proposed project, so impact thresholds are intended to provide a very rough semi-quantitative tool for assessing relative degree of impact. Projected future changes in sediment nutrient concentrations under the various alternatives are estimated using qualitative assumptions on the rate of decline in existing nutrient loads due to removal of cattle in addition to expected future nutrient loading from creek or fluvial sediment transport processes such as overbank flooding, estuarine sediment transport processes, and use of the Project Area by wildlife.

TABLE 37. SEDIMENT QUALITY - NUTRIENTS

Source: RWQCB Basin Plan **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed **Duration**: Short-Term, Long-Term	
No Impact	There would be no change in nutrient concentrations within sediment in the Project Area.
Negligible	Estimated changes in the concentration of nutrients (i.e., TKN) within sediment would be negligible and remain within the range of natural variability in natural wetlands (± 50 percent relative to baseline concentrations).
Minor	Estimated changes in the concentration of nutrients (i.e., TKN) within sediment would be minor (± 51 -100 percent relative to baseline concentrations). For adverse impacts, change would be roughly equivalent to introducing light grazing to natural wetland.
Moderate	Estimated changes in the concentration of nutrients (i.e., TKN) within sediment would be moderate (± 101 - 200 percent relative to baseline concentrations). For adverse impacts, change would be roughly equivalent to introducing heavy grazing and manure disposal to natural wetland.
Major or Substantial	Estimated changes in the concentration of nutrients (i.e., TKN) within sediment would be major (± > 200 percent relative to baseline concentrations). For adverse impacts, change would be roughly equivalent to converting into manure disposal area.

Sediment Quality – Contaminants: Tomales Bay has not been impacted by the number of contaminants and degree of contamination as has highly urbanized watersheds such as San Francisco Bay, but it still has been affected by contamination, principally by metals. Within the Project Area and southern portion of Tomales Bay, the contaminants of concern appear largely to be mercury from the Gambonini mine in the Walker Creek watershed; lead from decades of hunting within and adjacent to the Project Area; and contaminants from possible leaching of the now-closed West Marin Landfill in the Tomasini Creek watershed directly upstream of the Project Area (Parsons and Allen 2004a). Through restoration of hydrologic connectivity, the proposed project has the potential to affect concentration and/or distribution of contaminants in the Project Area, as well as outside of the Project Area.

Impact thresholds are based on semi-quantitatively estimating the potential for change in average concentrations for any contaminants of concern identified for the Project Area and vicinity. The analysis takes into account known or estimated existing or baseline contaminant concentrations in the Project Area and immediate vicinity, including any localized "hotspots," as well as anticipated changes in the future through potential influx of contaminants from flooding and creek or fluvial sediment transport processes, as well as from estuarine sediment transport processes. Impact thresholds are based on several sediment quality guidelines that have been developed, including the Effects Range sediment quality guidelines by the National Oceanic and Atmospheric Administration.

The Effects Range sediment quality guidelines identify which concentrations of contaminants have been associated with biological effects in laboratory, field, or modeling studies. Effects Range-Low (ERL) is "rarely" associated with adverse effects, while Effects Range-Median (ERM) is "occasionally" associated with adverse effects: those above the ERM are "frequently" associated with adverse effects. Some metals are naturally high in the San Francisco Bay region due to the presence of certain minerals and ultramafic rocks such as

serpentine (Hornberger et al. 1999)with background (pre-industrialization) concentrations actually exceeding thresholds of the Effects Range guidelines (Gandesbery et al. 1999). An Ambient Sediment Criteria (ASC) has been developed for the San Francisco Bay region to reflect these regional anomalies (Gandesbery et al. 1999). The standardized percent change used in the impact threshold criteria (±80 percent) represents roughly the mean or average percent change between the different standards: 1) ASC or background/regional ambient conditions, 2) ERL, and 3) ERM concentrations for all the contaminants of concern (e.g., lead, mercury, cadmium; Table 38). Because changes in sediment contaminant concentrations were not modeled using computers, impact thresholds are intended to provide only a very rough semi-quantitative tool for assessing the relative degree of change or impact.

TABLE 38. SEDIMENT QUALITY – CONTAMINANTS

Source: RWQCB Basin Plan, RCRA **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed **Duration**: Long-Term	
No Impact	There would be no change in contaminant concentrations within sediment in the Project Area.
Negligible	Estimated changes in the concentration of contaminants of concern within sediment would be negligible (± 80 percent relative to baseline conditions). For natural, relatively unpolluted wetlands, there would be a barely detectable change in concentrations, with concentrations remaining within the range of ambient sediment concentrations or ASC.
Minor	Estimated changes in the concentration of contaminants of concern within sediment would be minor (± 81 -160 percent relative to baseline conditions). For adverse impacts to natural, relatively unpolluted wetlands, there would be a measurable change that would increase concentrations, but levels would be maintained below the ERL.
Moderate	Estimated changes in the concentration of contaminants of concern within sediment would be moderate (± 161-240 percent relative to baseline conditions). For adverse impacts to natural, relatively unpolluted wetlands, there would be an appreciable change that would increase concentrations above the ERL, but maintain below the ERM.
Major or Substantial	Estimated changes in the concentration of contaminants of concern within sediment would be moderate (± > 240 percent relative to baseline conditions). For adverse impacts to natural, relatively unpolluted wetlands, there would be a highly striking change that would increase concentrations above the ERM.

Impact Analysis

TABLE 39. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR SOIL RESOURCES

All impacts are analyzed for the Project Area and Watershed. Potential watershed effects are analyzed under Water Resources – Water Salinity and Quality.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	***Intensity, Nature, Type, Duration, and Context of Impact***				
Sediment Nutrients – Project Area Short-Term	Beneficial – Negligible	Beneficial – Negligible	Beneficial – Negligible	Adverse - Negligible	Adverse - Negligible
Long-Term	Beneficial – Minor	Beneficial – Moderate	Beneficial – Moderate	Beneficial – Moderate	Beneficial – Moderate
Sediment Nutrients – Watershed Short-Term	No Impact	Beneficial – Negligible	Beneficial – Negligible	Beneficial – Negligible	Beneficial - Negligible
Long-Term	Beneficial – Negligible/ Minor	Beneficial – Negligible/ Minor	Beneficial – Negligible/ Minor	Beneficial – Negligible/ Minor	Beneficial – Negligible/ Minor
Sediment Contaminants – Project Area	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Minor	Adverse - Minor
Sediment Contaminants – Watershed Short-Term	No Impact	Beneficial – Negligible	Beneficial – Negligible	Beneficial – Negligible	Beneficial - Negligible
Long-Term	Beneficial – Negligible	Beneficial – Negligible	Beneficial – Negligible	Beneficial – Negligible	Beneficial – Negligible

No Action Alternative

Analysis: The impacts of the No Action Alternative on soil resources would generally range from have negligible to minor effects on soil resources in the Project Area (Table 39). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. (The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch.) The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Under the terms of the existing purchase agreement, the Project Area will convert from a dairy in early 2007 to lands that would be largely managed as open space, although there is a potential for leased grazing for dairy heifers (young cows) or beef cattle through a separate environmental review process. When the dairy closes in 2007, most of the agricultural management practices associated with dairying will cease, including light and intensive spreading of manure; irrigation; and annual mowing.

Nutrients: Under this alternative, changes in soil nutrient conditions would be expected primarily in the Giacomini Ranch, with any change in Olema Marsh expected to remain within the range of natural variability. Over the short-term, the reduced scale of agricultural operations and management would be expected to have only negligible beneficial effects on sediment nutrient concentrations, because, while there may be some short-term fluctuations in levels of nitrates, ammonium, or phosphates, the nutrient "pool" within sediments is generally stable from year-to-year and responds slowly to change. Any changes within the first 10 years following closure of the dairy would be expected to fall within the rather large range of natural variability characteristic of sediments in wetland and agricultural areas. Olema Marsh is not grazed by cattle, so the nutrient cycle within this portion of the Project Area is affected more by nutrient loading from upstream sources and limitations on nutrient processing once nutrients have entered the marsh, with the lack of oxygen within the permanently impounded sediment hampering breakdown of organic matter and conversion to inorganic nutrients.

Over the long-term, this alternative would be expected to result in minor beneficial effects on soil nutrients in the Giacomini Ranch through the reduction in grazing intensity typically associated with beef cattle or heifer grazing and elimination of agricultural management practices such as light or heavy application of manure to pastures. Grazing dairy cattle can generate as much as 0.65 to 0.9 pounds of nitrogen in excreted waste per day depending upon the amount of time that cattle are kept in pastures (Van Horn et al. 1999 *in* (Downing 2001). Because no effort would be made to remove manure disposal areas in the Giacomini Ranch East Pasture, nutrient levels in this 13-acre area would be expected to decrease, but remain high relative to natural wetland and even to moderately grazed lands for the foreseeable future. Currently, manure disposal areas have Total Nitrogen levels that are roughly six (6) times that of the heavily grazed or managed pastures in the Giacomini Ranch (NPS, unpub. data). In general, if leased grazing were approved, nutrient concentrations within the currently more highly managed East Pasture would be expected to decrease over time, dropping slightly to levels consistent with lightly managed agricultural lands such as the West Pasture. Ambient nutrient concentrations in the East Pasture would be slightly more than double that of the West Pasture (NPS, unpub. data). Nutrient concentrations within the lightly managed West Pasture would be expected to remain stable. Nutrient concentrations, on the other hand, in sediments of Lagunitas Creek within the Project Area would be expected to drop substantially due to the elimination of cattle from Lagunitas Creek. Dairy cattle currently access the West Pasture by crossing the creek just downstream of White House Pool. Should grazing be removed entirely, the amount of reduction in sediment nutrient concentrations within the Giacomini Ranch would be expected to increase slightly over the long-term, although manure disposal areas or pastures would remain high for the foreseeable future.

Within the East Pasture, the rate of change might be highest in the 11-acre restored area in the northwestern corner of the East Pasture. This area would be restored through removing the existing levees and reestablishing a tidal connection for the now hydrologically isolated northern end of the East Pasture Old Slough. (A new levee would be constructed at the southern end of the 11-acre restoration area.) Through levee removal and hydrologic reconnection, the potential for influxes of nutrients from both fluvial/creek and tidal sources would increase exponentially, particularly during periods of flooding and extreme high tides. Natural wetlands are believed to remove as much as 50 percent of ammonium, 50 percent of Total Nitrogen, 20- 45 percent of Total Phosphates, and more than 90 percent of fecal coliform from municipal wastewaters or stormwaters or from natural waters with high concentrations of nutrients, pathogens, and contaminants (Kadlec and Knight 1996; van der Lee et al. 2004) CH2M Hill *in* Kadlec and Knight 1996). These nutrients are

uptaken by plants, stored long-term in sediment, or, for nitrogen, potentially released to the atmosphere through volatilization. Based on water quality sampling in the adjacent portion of Lagunitas Creek, the potential for substantial nutrient influxes to this relatively small portion of the Project Area would be extremely negligible.

Contaminants: Changes in sediment contaminant concentrations in the Project Area under this alternative would be expected to be extremely negligible, with the only real potential for impact in the 11-acre restored area. A sediment screening evaluation was conducted as part of baseline studies for the Project Area, with the potential contaminants of concern being lead shot from decades of hunting on the Giacomini Ranch and mercury from redistribution of contaminated sediments near the outer portion of Tomales Bay eventually into the southern portion of the watershed. The only contaminant detected in the Project Area was cadmium, which actually occurred outside the Giacomini Ranch in Tomasini Creek directly upstream of Mesa Road (Parsons and Allen 2004a). Mercury, methylated mercury, and lead were not detected in the Project Area – even, in the case of methylated mercury, with extremely low detection limits. However, mercury, in particular, continues to be a concern, because of its longevity in the environment, its propensity to be transformed in wetlands soils to an even more toxic form (methylmercury), and its ability to move within aquatic environments through frequent sediment suspension and redistribution. Studies conducted in Tomales Bay in the 1990s showed that mercury concentrations followed somewhat of a bell curve distribution, with the lowest concentrations occurring at the furthest northern and southern ends of the Bay (D. Whyte, RWQCB, *pers. comm*.).

Changes to sediment contaminants in the Project Area under this alternative would be considered to be extremely negligible, because this alternative would involve very limited levee removal for the 11-acre mitigation area, leaving the rest of the Giacomini Ranch and Olema Marsh isolated from Lagunitas Creek. In addition, there would be no change in the channel alignment or flow pattern of Tomasini Creek that would increase its influence on the Giacomini Ranch. Currently, Tomasini Creek only tops its levees and floods into the East Pasture during large flood events such as the late 2005 30-year flood event, although the creek is known to have at least one connection with the East Pasture via a culvert that allows high tide waters to flood into the shallowly flooded area that attracts moderate numbers of waterfowl and shorebirds during the winter. The potential risk for contaminant influx into the Project Area could increase over the long-term because of levee degradation and the increased connectivity between the Giacomini Ranch and potential contaminant sources in bay and creek waters. It could also increase, because of increased tidal inundation within the Project Area due to sea level rise, which appears to be increasing at a much higher rate than originally predicted based on recently published studies (Overpeck et al. 2006).

Watershed: From a watershed perspective, the No Action Alternative would have no impacts to very negligible beneficial effects on sediment nutrient and contaminant concentrations over the short-term. The levees effectively keep most, if not all, of the nutrients and contaminants present in the Giacomini Ranch on-site, while also preventing influx of nutrient and contaminants from upstream sources onto floodplains during flood events that could improve downstream water quality. Over the long-term, degradation of the levees could increase the ability of the Giacomini Ranch to improve the quality of downstream sediment resources in the southern portion of Tomales Bay by retaining many of the nutrients, contaminants, and other pollutants present in flood flows from Lagunitas, Olema, and Tomasini Creeks. This subject is discussed in more detail under Water Resources. If so, this alternative could ultimately have a negligible to minor beneficial effect on sediment nutrients and contaminants within the southern portion of the watershed.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There is only one project that would potentially have a cumulative impact should the No Action alternative be implemented. The proposed Bear Valley Creek Watershed Enhancement Project would replace undersized or otherwise hydraulically limiting stream crossing infrastructure in the middle and upper portions of the watershed. Changes in erosion or sedimentation patterns resulting from this project could have cumulative effects on soil resources through changing sediment transport patterns in the subwatershed and patterns of deposition and erosion, leading to possible changes in levels of sediment nutrients and contaminants in both Olema Marsh and Lagunitas Creek. Changes in erosion or sedimentation patterns resulting from this project could have cumulative effects on nutrients in sediments, because nutrients

and contaminants are often bound to sediment. Because of the flat gradient through lower Bear Valley Creek and Olema Marsh, the Bear Valley Creek project is unlikely to increase erosion rates. Therefore, cumulative impacts on soil resources would be considered to be potentially adverse, though minor in intensity.

Other than the Bear Valley Creek project, there are no currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts in the Giacomini Ranch should the No Action Alternative be implemented. The RWQCB instituted a clean-up of the Gambonini mine that dramatically reduced the potential for additional mercury to enter Tomales Bay, but it did not address mercury that had already entered the Bay and that is being stored and redistributed in estuarine sediments. The RWQCB had also been attempting to force the owners of the West Marin Landfill in the Tomasini Creek watershed to perform some remedial clean-up that would decrease documented problems with leaching of landfill materials into the creek, but a Marin County judge dismissed the case (D. Elias, RWQCB, *pers. comm*.). Enforcement action is reportedly being pursued by another agency.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of the No Action Alternative on soil resources would range from negligible adverse to beneficial minor in the Project Area and from no impact to beneficial negligible in the watershed. The shift from a dairy to either leased grazing and/or open space lands that would occur as part of the Park Service's existing agreement with the Giacomini Trust would result in a long-term minor to moderate reduction in nutrients, because the intensity of any agricultural uses that would be approved through a separate environmental process in the future would be of a much lesser scale and intensity than the current dairy operation, The current dairy operation often disposes of manure through concentrated application in certain pastures with light application elsewhere in the East Pasture. Sediment contaminant concentrations, which appear to be very low currently (Parsons and Allen 2004a), might increase negligibly from removal of levees in the 11-acre mitigation that would be performed in the northwestern portion of the East Pasture to satisfy the Park Service's existing mitigation agreement with CalTrans. Over the long-term, levee degradation would increase both fluvial/creek and tidal influences and thereby potentially increase exposure to contaminants such as mercury that occur in the outer portion of Tomales Bay currently and that is known to actively move within watersheds through sediment resuspension and redistribution. This would be compounded by increased tidal inundation caused by sea level rise.

Alternative A

Analysis: The impacts of Alternative A on soil resources in the Project Area and watershed would generally range from negligible adverse to moderate beneficial (Table 39). Under Alternative A, the East Pasture would be restored. There would be no restoration in the West Pasture or Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels.

Nutrients: As with the No Action Alternative, changes in soil nutrient conditions would be expected primarily in the Giacomini Ranch, with any change in Olema Marsh expected to remain within the range of natural variability. Soil nutrient conditions would be expected to change in the heavily managed East Pasture, which is being actively restored, but they would also change in the more lightly managed West Pasture through passive removal related to removal of cows. Olema Marsh is not grazed by cattle, so the nutrient cycle within this portion of the Project Area is affected more by nutrient loading from upstream sources and limitations on nutrient processing once nutrients have entered the marsh. The lack of oxygen within the permanently impounded sediment hampers breakdown of organic matter and conversion to inorganic nutrients.

Over the short-term, the conversion from heavily and lightly managed agricultural operations to open space lands would be expected to have only negligible effects on sediment nutrient concentrations, because, while there may be some short-term fluctuations in levels of nitrates, ammonium, or phosphates, the nutrient "pool" within sediments is generally stable from year-to-year and responds slowly to change. Therefore, generally, any change within the first 10 years following closure of the dairy would be expected to be within the rather large range of natural variability observed in sediment in the Project Area and vicinity. There would be some immediate improvement with excavation of 1.5 to 3 feet of the soil surface within the 13-acre manure disposal area, which would be hauled off locally to fill in the manure disposal ponds near the dairy facility. As will be

discussed in greater detail under Water Resources – Hydrologic Processes, an increase in the frequency of flooding would bring new sediments that may act to effectively bury some of these high nutrient soils.

Over the long-term, this alternative would be expected to result in moderate beneficial effects on soil nutrient conditions in the Giacomini Ranch, largely because of removal of agricultural operations. Total nutrient concentrations would be expected to decrease relative to both baseline conditions of intensive agricultural management and the No Action Alternative, although the rate of change may remain roughly similar between the two alternatives. Under Alternative A, soil nutrient conditions would be expected to drop substantially over time, eventually reaching levels that are consistent with those observed in natural, undiked marsh soils. Excavation of the nutrient-laden surface soils in the manure disposal area or pasture should hasten reductions in nutrient loads to those observed in highly managed or intensively grazed areas, which can be approximately six (6) times lower than manure disposal areas in terms of Total Nitrogen (NPS, unpub. data). Nutrient concentrations in localized portions of Lagunitas Creek within the Project Area would be expected to drop substantially due to the elimination of Giacomini cattle from Lagunitas Creek, although upstream cattle influences outside of the Project Area would continue to exist. Dairy cattle from the Giacomini Ranch currently access the West Pasture by crossing the creek just downstream of White House Pool. Over time, nutrient concentrations in the East Pasture would be expected to drop to levels similar to those in the less intensively grazed and managed areas such as the West Pasture. Ambient nutrient concentrations in the East Pasture would be slightly more than double that of the West Pasture (NPS, unpub. data). Nutrient concentrations within the lightly managed West Pasture would be expected to decrease slightly.

While removal of cattle and manure would eliminate one large source of nutrients, breaching of levees and hydrologic reconnection of the East Pasture with Lagunitas Creek and Tomales Bay would introduce others -- nutrients carried by fluvial/creek and tidal waters in Lagunitas Creek. In terms of the amount of area exposed, the largest nutrient loading periods would occur during flooding and higher and extreme tide events, although intertidal areas below Mean High Water (MHW) would be exposed to nutrient influx from outside sources on a more regular basis. Water quality sampling conducted over the past four years at the upstream and downstream ends of Lagunitas Creek in the Project Area suggests that concentrations of nutrients such as nitrates within at least this section of the creek are normally moderate (mean concentrations < 1.0 mg/L and mean instantaneous loading <1 mg per second or mg/s), although instantaneous loading rates during a 2.25-year storm event in April 2006 storm climbed as high as approximately 220 mg per second (mg/s; Parsons, *in prep*.). During these types of smaller flood events, approximately 10 percent of Lagunitas Creek floodwaters, which carry sediment, nutrients, pathogens, and contaminants, could flow into the East Pasture (KHE 2006a). Natural wetlands are believed to remove as much as 50 percent of ammonium, 50 percent of Total Nitrogen, 20-45 percent of Total Phosphates, and greater than 90 percent of fecal coliforms from municipal wastewaters or stormwaters or natural waters with high nutrient, pathogen, or contaminant loads that flow onto floodplains or marshplains during flood events (Kadlec and Knight 1996, van der Lee et al. 2004, CH2M Hill *in* Kadlec and Knight 1996). Retention of nitrates in floodplains is considerably lower (~2- 3 percent) due to the fact that these nutrients are not bound to sediment and tend to be transported through floodplains unless waters are detained for a substantial amount of time (van der Lee et al. 2004).

Once deposited, these nutrients are uptaken by plants, stored long-term in sediment, or, for nitrogen, potentially released to the atmosphere as gasses through volatilization depending on soil conditions, particularly the amount of aeration or oxygen in the soils. Breaching of levees not only increases the potential for nutrient influx, but ultimately affects the fate of these newly deposited nutrients, sediments, and contaminants, as well as the rate and exact timeframe over which reductions in agriculturally-related nutrients and pathogens would occur. Nutrients are more efficiently processed in well-aerated soils than in soils that are low in oxygen due to permanent, semi-permanent, or even seasonal inundation or saturation. This is the mechanism by which wetland soils act as such efficient trappers or filters of nutrients and contaminants, with anoxic conditions often limiting processing or conversion and/or causing nutrients and contaminants to become strongly bound or "sorbed" to soils, metals, and minerals. In less frequently inundated areas such as the higher intertidal zones or upland areas, sediment-associated nutrients such as ammonium and organic nitrogen would tend to be released and rapidly converted into oxygenated forms of nitrates such as nitrates that would either be uptaken by plants or lost to the atmosphere as nitrogen gas. In more frequently inundated areas where soils remain anoxic, conversion to nitrates would be reduced, and nutrients such as ammonium would remain strongly sorbed to soils. Phosphorous follows a somewhat different trajectory than many other nutrients and contaminants, such that oxygenated soil conditions enhance retention of phosphorous. Soils where even the soil-water interface zone becomes anoxic or depleted of oxygen often release phosphorous into overlying waters. Some managed wetlands have pulses of phosphates during periods of high productivity such as the spring and summer, when oxygen in overlying waters drop to no or

very low levels at night because of high respiration or oxygen demand (Parsons and Martini-Lamb 2003). Former agricultural soils often show pulses of phosphorous in restoration situations where soils are either temporarily flooded or dried because of release of iron-bound phosphorous or conversion of organic to inorganic phosphorous, respectively (Aldous et al. 2005).

In certain areas of the Giacomini Ranch and certainly in Olema Marsh, inundation and saturation conditions have actually been exacerbated to varying degrees by the tendency of levees to impound waters. In addition, the Giacominis flood and spray irrigated most of the East Pasture during the summer, thereby prolonging the period of inundation or saturation. Without irrigation, some of the higher areas would actually become drier under undiked conditions. Based on estimates from hydraulic modeling, upland and higher intertidal elevations would represent approximately 86 percent of the West Pasture and 47 percent of the East Pasture (KHE 2006a). Therefore, breaching of levees may not only increase the potential for influx, but the potential for efflux through either more efficient processing of organic matter and inorganic nutrients or through release into overlying waters.

Contaminants: Changes in sediment contaminant concentrations under this alternative would be expected to be negligible, with the potential for change restricted to the 350-acre East Pasture. A sediment screening evaluation was conducted as part of baseline studies for the Project Area, with the potential contaminants of concern being lead shot from decades of hunting on the Giacomini Ranch and mercury from redistribution of contaminated sediments near the outer portion of Tomales Bay eventually into the southern portion of the watershed. The only contaminant detected in the Project Area was cadmium, which actually occurred outside the Giacomini Ranch in Tomasini Creek directly upstream of Mesa Road (Parsons and Allen 2004a). Mercury, methylated mercury, and lead were not detected in the Project Area – even, in the case of methylated mercury, with extremely low detection limits. However, mercury, in particular, continues to be a concern, because of its longevity in the environment, its propensity to be transformed in wetlands soils to an even more toxic form (methylmercury), and its ability to move within aquatic environments through frequent sediment suspension and redistribution. Studies conducted in Tomales Bay in the 1990s showed that mercury concentrations followed somewhat of a bell curve, with the lowest concentrations the furthest northern and southern ends of the Bay (D. Whyte, RWQCB, *pers. comm*.).

Changes to sediment contaminants under this alternative would be considered to be negligible, because potential exposure to Bay, or creek, sources of contaminants would be restricted largely to the breached East Pasture, and the risk that sediments within the East Pasture would become contaminated by mercury would appear at this time to be relatively minor. In addition, there would be no change in the channel alignment or flow pattern of Tomasini Creek that would increase its influence on the Giacomini Ranch. Currently, Tomasini Creek only tops its levees and floods into the East Pasture during large flood events such as the late 2005 30-year flood event, although the creek is known to have at least one connection with the East Pasture via a culvert that allows high tide waters to flood into the shallowly flooded area that attracts moderate numbers of waterfowl and shorebirds during the winter. The potential risk for contaminant influx into the Project Area could increase over the long-term because of increased tidal inundation within the Project Area due to sea level rise, which appears to be increasing at a much higher rate than originally predicted based on recently published studies (Overpeck et al. 2006).

Watershed: From a watershed perspective, Alternative A would have negligible to perhaps minor beneficial effects on sediment nutrient and contaminant concentrations. Over the short term, disturbance of sediments from construction activities may increase the influx of sediment-associated nutrients and contaminants to downstream waters, but as discussed earlier, removal of the levees would encourage Lagunitas Creek to overflow onto its historic East Pasture floodplains during flood events and thereby decrease the amount of nutrients, contaminants, and other pollutants that are carried downstream into the southern portion of Tomales Bay for eventual deposition into subtidal and intertidal sediments. (This subject is discussed in more detail under Water Resources.) While the magnitude of the effect of the proposed project on sediment resources in downstream portions of the watershed is hard to predict, it would be expected to remain within the relatively broad range of natural variability observed in these systems.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The impacts of Alternative A on soil resources in the Project Area and watershed would generally range from negligible adverse to moderate beneficial (Table 39). While changes in the Project Area would not be dramatic over the short-term, over the long-term, moderate reductions in nutrient concentrations within sediment of the Giacomini Ranch would be expected to be generated by the elimination of cattle and conversion to open space and potential changes in nutrient processing capabilities with breaching of levees and better drainage of soils. Hydrologic reconnection of the Giacomini Ranch to Lagunitas Creek would increase the potential for influxes of nutrient-laden waters from fluvial and tidal sources, including Lagunitas Creek. Sediment contaminant concentrations, which appear to be very low currently (Parsons and Allen 2004a), might increase negligibly from breaching of the East Pasture levees. Levee breaching and hydrologic reconnection would increase both fluvial/creek and tidal influences and thereby potentially increase exposure to contaminants such as mercury that occur in the outer portion of Tomales Bay currently and that are known to actively move within watersheds through sediment resuspension and redistribution. However, the potential risk of mercury contamination appears relatively negligible at this time based on recent sampling that showed that most of the mercury was concentrated in the outer Bay, with levels dropping off sharply towards the southern end of Tomales Bay. From a watershed perspective, this alternative would have negligible to perhaps minor beneficial effects on the quality of subtidal and intertidal sediments in Tomales Bay through a potential decrease in loading of nutrients, contaminants, and other pollutants from Lagunitas Creek due to increased connectivity of the creek with its historic floodplain on the Giacomini Ranch.

Alternative B

Analysis: Alternative B would have very similar effects to Alternative A in terms of effect on soil resource conditions in the Project Area and the watershed (Table 39). The primary differences between Alternative B and A relate to the fact that, in Alternative B, the East Pasture levees would be removed completely, and the West Pasture levees would be breached in several locations. In the East Pasture, the shift to full levee removal is expected to have relatively negligible effects on the amount and rate of reduction in soil nutrients or the potential for exposure to contaminants such as mercury. Levee breaching of the West Pasture might increase the amount and rate of nutrient reductions in soils or increase the potential for exposure to contaminants such as mercury, but the degree of change would be relatively minor, because this pasture is less intensively managed and grazed. In terms of contaminants, the West Pasture, which appeared to be relatively uncontaminated based on contaminant screening (Parsons and Allen 2004a), is already exposed to potential contaminants from sources in the bay through muted tidal flushing on Fish Hatchery Creek, which runs parallel to and is influenced to some degree by Lagunitas Creek. However, breaching of the levee along Lagunitas Creek would increase potential exposure to Bay, or creek, sources of contaminants, although the risk that sediments within the West Pasture would become contaminated by mercury would appear at this time to be relatively minor.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative B would have very similar effects to Alternative A in terms of effect on soil resources in the Project Area and the watershed (Table 39). The impacts of Alternative B would range from adverse negligible to beneficial moderate. The primary difference between Alternative B and Alternative A is that the East Pasture levee is removed completely and that the West Pasture is now included in the proposed project, with limited breaching of the levee. These changes would not be expected to have more than negligible effects on the overall amount and rates of soil nutrient reductions and the potential for exposure to

contaminants such as mercury.

Alternative C

Analysis: Alternative C would have very similar effects to Alternative B in terms of effect on soil resources in the Project Area and watershed, except for effects related to restoration of Olema Marsh and Tomasini Creek (Table 39). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and drainage of currently impounded waters. Poor drainage has converted Olema Marsh into an extensive vegetated and open water pond with no stream gradient, and there is some evidence that water levels are continuing to increase over time (KHE 2006a). In future years, should these initial actions not appear to lead to the desired degree of restoration, the Park Service, CSLC, and Audubon Canyon Ranch (ACR) would consider replacement of the culverts at Levee Road or Bear Valley Road or both culverts.

Because excavation and/or culvert replacement would be expected to substantially improve hydraulic connectivity of Olema Marsh and Lagunitas Creek and increase drainage of ponded waters, water surface elevations within Olema Marsh would drop substantially, exposing the thick layer of peat or organic rich-soils to air. Aeration of the underlying peat materials would cause rapid decomposition or breakdown of organic materials. The expected range of water surface level change would range from as much as 4 feet with removal of the berm and shallow excavation of the channel up to 6 feet with replacement of the Levee Road culvert (KHE 2006b). The effect of these improvements in hydrologic connectivity would be eased by phasing the adaptive restoration components over time.

Nutrients: Oxidation of impounded soils, particularly peat soils or soils that were historically exposed to tidal influence, can dramatically affect nutrient conditions within soils. Rapid decomposition of peat and organic-rich mineral soils can generate a pulse in mineralization or production of inorganic nutrients, with pH often driving which nutrient forms are the most prevalent (DeLaune and Smith 1985; Anisfeld and Benoit 1997; Portnoy 1999; Sommer and Horwitz 2001; Parsons and Martini-Lamb 2003). Oxidation often results in a lowering in soil pH because of the production of humic acids and other types of acids, and these acids can shift the nutrient pathway away from nitrification or the production of nitrates from ammonium. In addition, introduction of saltwater can decrease binding of ammonium already present in soils through the higher ionic strength of saltwater relative to minerals or organic matter (Portnoy 1999). Nutrients produced through breakdown of organic matter or such as ammonium and phosphate can either remain in drained soils, or they can be flushed into overlying waters when soils are flooded again (Delaune and Smith 1985, Portnoy 1999). Often, these pulses are relatively short-lived, lasting a matter of weeks (Anisfeld and Benoit 1997, Parsons and Martini-Lamb 2003). Nutrient efflux into overlying waters may also be spatially variable, with areas exposed to tidal influence having higher rates of efflux because of cation exchange. The implications of the nutrient efflux for water quality are discussed in greater detail under Water Resources.

The pH in systems that are drained is often depressed further in saline or tidally influenced soils (pH ~ 3-4 with pH 7 considered normal) than in freshwater wetland ones (pH ~5.0), because oxidation of pyrite and other iron-sulfur compounds in tidally influenced soils leads to extensive production of additional acidic compounds (e.g., sulfuric acid and ferrous iron; Delaune and Smith 1985). The persistence of acidic conditions within soils depends to a large degree on the influx rate of waters high in carbonates such as seawater, groundwater, or streams, with acids typically quickly buffered in wetlands with some consistent source of water. The peat underlying Olema Marsh is expected to be relatively fresh or low salinity in nature, at least within surface layers, because tidal influences have been largely precluded or at least limited since construction of Levee Road in the late 1800s. However, estuarine-derived muds and peat probably underlie the peat at some unknown depth. Therefore, pHs generated by breakdown of organic matter would be expected to be closer to 5 than 3-4, and permanent Bear Valley Creek inflow, combined with persistent subsurface groundwater inflow from the Inverness Ridge, would be expected to buffer acids within a short time of being produced, although there could be some spatial variability within the marsh where lower pHs persist.

The reintroduction of tidal influence into Olema Marsh after many decades of absence may have other effects on the chemistry of its soils. An influx of sulfates, which are naturally high in ocean waters, would occur during daily tidal flows, and these sulfates would typically be reduced in the low or no oxygen environment of

wetland soils to its reduced form, sulfides. Abundant sulfides in the root zone can be toxic to plants. In many marshes, this toxicity is avoided through binding of sulfides with iron, which neutralizes its effect on plants. Tidally influenced marshes with low iron content and/or stagnant water conditions are likely to have higher sulfide concentrations within soils. Sustained high sulfide concentrations were observed in diked marshes that had been historically waterlogged with freshwater from improper drainage when seawater was reintroduced, because of the low levels of iron (Portnoy 1999). Some studies in San Francisco Bay have shown lower iron concentrations in brackish/freshwater marshes than salt marshes (Goman 2005). A sediment screening study conducted in the Project Area revealed very high concentrations of iron in all sediment samples high despite that some of the areas had been diked for decades and isolated from tidal influence. Iron is naturally high in the Tomales Bay and other San Francisco Bay watershed and is detected regularly in creek and groundwater (NMWD, unpub. data). The permanent Bear Valley Creek flow, as well as subsurface groundwater inflow from the Inverness Ridge, would be again to be expected to buffer Olema Marsh against negative of seawater reintroduction by maintaining iron concentrations in the peat, which is known to strongly bind iron (Syrovetnik and Neretnieks 2002).

Over time, subsidence would be expected to reach some kind of equilibrium with water surface levels, but while subsidence can occur relatively rapidly, the long-term effects of drainage on sediment nutrient pools and fluxes can persist for some time, with effects noted in some marshes even 10 years after marshes had been drained (Portnoy 1999). For the purposes of this evaluation, analysis of short-term effects takes into account the longer time horizons needed for resources that are typically relatively stable over time to reach post-restoration equilibrium conditions and assumed to be at least 10-15 years. During this intermediate period, a tremendous shift would be expected, at least in surficial soils, from organic nutrient forms (peat) to inorganic forms such as ammonium and phosphate, with a possible efflux of nutrients out of the soils (Portnoy 1999). For this reason, short-term effects of this alternative in Olema Marsh nutrient pools would be characterized as minor to moderate and probably, although not necessarily, adverse. From an overall project perspective, both Giacomini Ranch and Olema Marsh would be expected to experience at least negligible to minor reductions in nutrients over the short-term, with effects becoming more pronounced (moderate) for the Giacomini Ranch over the long-term. For Olema Marsh, on the other hand, the degree of change would be expected to decrease appreciably in the long-term as the marsh came into equilibrium with changed water surface level conditions. While reductions in nutrient concentrations in Giacomini Ranch soils can easily be interpreted as beneficial, in Olema Marsh, the changes in soil nutrients over the long-term are harder to characterize. However, impoundment of waters could be interpreted as having created artificially high nutrient pools in the form of inorganic nutrients (peat and organic matter), with restoration beneficial in reestablishing more natural and balanced soil nutrient concentration and processing conditions characteristic of conditions prior to diking in the late 1800s.

Contaminants: These same biogeochemical processes have implications for contaminants, as well as nutrients. Under oxidized conditions, many marsh soils will release sediment-bound contaminants into overlying waters. Oxidation in and of itself does not necessarily lead to release of metals, but oxidation combined with a sharp decrease in pH as is often observed in saline soils can encourage a "pulse" of formerly sediment-complexed metals into the water column. Studies have documented releases of a variety of metals, including silver, aluminum, cadmium, chromium, copper, iron, manganese, nickel, lead, selenium, and zinc (DeLaune and Smith 1985; Soukup and Portnoy 1986; Gambrell et al. 1991; Anisfeld and Benoit 1997). Release of contaminants such as metals appears to be higher from saline or saltwater wetland soils than freshwater wetland ones, probably because of the lower pHs often present in oxidized tidally influenced soils (pH ~3-4) than in freshwater wetland ones (~5.1; Delaune and Smith 1985). Soils high in humic acids or organic carbon also tend to bind metals (Syrovetnik and Neretnieks 2002), as well as organic contaminants such as DDT and other pesticides, as well as chlorinated benzenes.

As noted earlier, the peat underlying Olema Marsh is expected to be relatively fresh or low salinity in nature, at least within surface layers, with historic estuarine-derived muds and peat some distance below the surface due to extensive build-up of the peat during the last 100 years. The potential for a pulse in metal or organic contaminants into overlying waters following draining and oxidation of Olema Marsh soils would appear relatively minor given the relatively low probability of any historic or current exposures to organic contaminants or metals, even metals such as nickel, chromium, and valanium that are naturally high in the ultramafic or serpentine soils found in the Franciscan Formation, which is prevalent in the San Francisco Bay region, including eastern Tomales Bay (Hornberger et al. 1999) The sediment screening survey conducted in the Project Area in 2003 did show ubiquitously high levels of nickel and chromium in the Project Area, except in Fish Hatchery Creek (Parsons and Allen 2004a). The upper portions of Fish Hatchery Creek, as well as Bear Valley Creek, drain completely off the Inverness Ridge, which is dominated by granitic rock such as quartz-

diorite and granodiorite that probably contains low levels of metals relative to the Franciscan Formation (G. Kamman, KHE, *pers. comm*.).

Within the Giacomini Ranch, the potential for exposure to contaminants would increase, because Tomasini Creek would be rerouted to connect with one of its historic alignments and move through the East Pasture. During high flow events that result in scour of the channel bed upstream of the Project Area, sediment-bound contaminants that may have originated from the now-closed West Marin Landfill could be remobilized and eventually deposited within the new channel or floodplain of Tomasini Creek. Because of the increase in exposure to contaminants – or conditions that could release contaminants such as those potentially occurring in Olema Marsh – effects of Alternative C on sediment contaminant conditions within the Project Area were characterized as adverse – minor. The potential risk for contaminant influx into the Project Area could increase over the long-term because of increased tidal inundation within the Project Area due to sea level rise, which appears to be increasing at a much higher rate than originally predicted based on recently published studies (Overpeck et al. 2006).

Watershed: From a watershed perspective, Alternative C would be expected to have negligible to minor beneficial effects on sediment nutrient and contaminant concentrations. Over the short term, disturbance of sediments from construction activities may increase the influx of sediment-associated nutrients and contaminants to downstream waters, but removal of the levees would encourage Lagunitas Creek to overflow onto its historic floodplains during flood events and thereby decrease the amount of nutrients, contaminants, and other pollutants that are carried downstream into the southern portion of Tomales Bay for eventual deposition into subtidal and intertidal sediments. (This subject is discussed in more detail under Water Resources.) The magnitude of this effect is expected to be slightly greater than under Alternative A, because of the inclusion of the West Pasture and the removal of levees on Tomasini Creek, which would act to direct more of the nutrient and contaminant load carried by high flows in this subwatershed into the Project Area rather than out into the bay.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: As discussed under the No Action Alternative, there is at least one project that could potentially cause cumulative impacts with the proposed project under Alternative C-- the proposed Bear Valley Creek Watershed and Fishery Enhancement Project. Changes in erosion or sedimentation patterns resulting from this project could have cumulative effects on nutrients in sediments, because nutrients and contaminants are often bound to sediment. Depending upon the duration of the transitional phase for Olema Marsh, the Bear Valley Creek project could cause influxes of nutrients to increase temporarily, which could end up having a temporary moderate adverse cumulative impact with the proposed project if decomposition of organic matter was still generating higher than normal levels of nutrients. This impact would be expected to dissipate with time as both the upper and lower systems come into equilibrium with changed conditions, reducing cumulative effects over the long-term to very negligible or even beneficial in nature. Contaminants are less of a concern in this watershed. Overall, then, cumulative impacts on sediment nutrients and contaminants in Olema Marsh would be considered to be adverse and negligible over the long-term, with adverse moderate effects possible over the short-term due to elevated nutrient levels. The potential for this project to affect sediment nutrient and contaminants in the Giacomini Ranch is considered extremely negligible.

Other than the Bear Valley Creek project, there are no currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts in the Giacomini Ranch should Alternative C be implemented. The RWQCB instituted a clean-up of the Gambonini mine that dramatically reduced the potential for additional mercury to enter Tomales Bay, but it did not address mercury that had already entered the Bay and that is being stored and redistributed in estuarine sediments. The RWQCB had also been attempting to force the owners of the West Marin Landfill in the Tomasini Creek watershed to perform some remedial clean-up that would decrease documented problems with leaching of landfill materials into the creek, but a Marin County judge dismissed the case (D. Elias, RWQCB, *pers. comm*.). Enforcement action is reportedly being pursued by another agency.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative C would have very similar effects to Alternative B in terms of effect on soil resources in the Project Area and watershed, with the intensity of impacts ranging from minor adverse to beneficial moderate (Table 39). The largest differences between Alternative C and Alternative B come from the inclusion of Olema Marsh and the rerouting of Tomasini Creek into one of its historic alignments in the East Pasture. Under this alternative, hydrologic connectivity and drainage of excessively impounded waters would be improved by excavation of berms and channel flow paths and potentially replacement of culverts at Levee Road and Bear Valley Road. These restoration actions would potentially decrease water surface levels from 4 to 6 feet over time through a phased approach to adaptive restoration. Decreases in water surface levels would expose flooded peat soils to air and cause rapid compaction through accelerated rates of organic matter decomposition that would have appreciable effects on soil nutrient pools. These changes would be expected to have minor short-term adverse impacts on soil nutrient conditions, but long-term effects would be considered beneficial as nutrient levels and rates of nutrient processing began to approach conditions more characteristic of natural undiked marshes.

In addition to its effect on nutrients, oxidation of waterlogged peat and saline soils can be accompanied by decreases in pH that often result in releases of sediment-bound contaminants to overlying waters. This effect is less pronounced in freshwater wetlands (Delaune and Smith 1985), and this, combined with the naturally low levels of contaminants expected from anthropogenic sources in this subwatershed, would suggest that the risk of contaminant release from oxidation of peat soils in Olema Marsh would be negligible. A higher potential for exposure to contaminants would probably come from rerouting of Tomasini Creek into one of its historic alignments through the East Pasture, thereby increase exposure of creek channels and adjacent floodplains to potential contaminant sources in Tomasini Creek that may have originated from the now-closed West Marin Landfill.

Alternative D

Analysis: Alternative D would have the same effects on soil resources in the Project Area and watershed as Alternative C (Table 39). Under Alternative D, Tomasini Creek would be rerouted completely into one of its historic alignments, but this difference is not expected to change its potential effects on soil nutrient and contaminant levels in the Project Area or watershed.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts for Alternative D would be the same as Alternative C.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative D would have the same effects on soil resources in the Project Area and watershed as Alternative C. Under Alternative D, Tomasini Creek would be rerouted completely into one of its historic alignments, but this difference is not expected to change its potential effects on soil nutrient and contaminant levels in the Project Area or watershed.

Air Resources – Air Quality

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

The Seashore and north district of the GGNRA are classified as a Class I area under the Clean Air Act (42 USC 7401 et seq.). The Act requires land managers of Class I areas to protect air quality and related values, including visibility, plants, animals, soils, water quality, cultural and historic structures, and visitor health from the effects of air pollution.

The Clean Air Act (CAA) charges the Environmental Protection Agency (EPA) with identifying national ambient

air quality standards to protect public health and welfare. A more detailed description of laws, regulations, and policies governing air quality can be found in Chapter 3 under Air Resources. Under the Clean Air Act, standards have been set for seven pollutants: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns (PM10), very fine particulate matter less than 2.5 microns in diameter (PM2.5), and lead (Pb). The air pollutants of greatest concern in the SFBAAB are O3, CO, and PM10. A description of these pollutants and standards can be found in Chapter 3 under Air Resources and in Tables 5-6. The federal government has ceded responsibility and authority to establish more stringent air quality standards and regulations to states, which are required to develop state implementation plans (SIP) to achieve and maintain federal air quality standards. The California Air Resources Board (CARB) has set stricter ambient air quality standards than national standards (Table 6 in Chapter 3 under Air Resources). Under the 1988 California Clean Air Act, air basins were designated as attainment, non-attainment, or unclassified for the state standards. The Bay Area Air Basin is classified as a California non-attainment area for ozone and particulate matter and a federal non-attainment area for ozone (Table 6 in Chapter 3 under Air Resources).

The Bay Area Air Quality Management District (BAAQMD) is the air quality management district for the Project Area and has primary responsibility for control of air pollution. State air quality agencies and other federal agencies are required to demonstrate conformity of actions to national air quality standards or, in the case of federal agencies, applicable SIPs developed by state air quality agencies. BAAQMD has prepared SIPs to address nonattainment and maintenance issues related to the national ozone standards and the national carbon monoxide standard and is in the process of revising the ozone SIP in collaboration with the Association of Bay Area Governments and MTC. The USEPA had been expected to issue a final action on the SIP revision, the *San Francisco Bay Area Transportation Air Quality Conformity Protocol*, in spring 2007, however, on December 22, 2006, the U.S. Court of Appeals for the District of Columbia Circuit vacated USEPA's Phase new 8-hour ozone implementation rule. The USEPA is currently analyzing impacts of this decision on its regulation of ozone.

The USEPA has developed criteria and procedures for determining the conformity of federal actions to the applicable SIPs. The Transportation Conformity rule (40 CFR parts 51 and 93) and the General Conformity rule (40 CFR parts 51 and 93) apply to nonattainment areas and maintenance areas covered by an approved attainment or maintenance plan. Under either conformity rule, conformance with an applicable SIP is demonstrated by showing that expected emissions are consistent with the emissions budget for the area or air quality basin. Certain types of federal projects, including trail construction, are considered to have the potential for only *de minimis* impacts and are not required to demonstrate conformance. Federal actions cannot cause or contribute to new violations, increase the frequency or severity of any existing violation, interfere with timely attainment or maintenance of a standard, delay emission reduction milestones, or contradict the State Implementation Plan. Certain types of federal projects, including trail construction, are considered to have the potential for only *de minimis* impacts and are not required to demonstrate conformance. Therefore, all Park Service areas are required to comply with state laws on these matters regardless of the type of legal jurisdiction that applies to other activities within the Park Service unit.

Significance criteria developed by the state and county under CEQA focus on the potential for the proposed project to conflict with or obstruction of implementation of Bay Area Air Quality Plan; violate air quality standards; contribute substantially to existing or projected air quality violation for the Basin; contribute cumulatively to a net increase of any pollutant that the Bay Area Air Quality Basin is not in attainment with; expose sensitive receptors to substantial pollutant concentrations such as fumes or dust; or create objectionable odors.

General Assumptions and Methodologies

- Potential impacts to air quality from the proposed project would result primarily from construction equipment operated during the construction period and any potential increase in vehicular trips associated with visitors and residents either coming to view the restored Project Area or using public access facilities.
- BAAQMD has established thresholds of significance under CEQA for construction and project operations-related impacts. These thresholds are used as a basis for establishing impact thresholds for impact indicators related to construction and short-term/long-term project-related on air quality and are used to determine whether the proposed project would be in conformance with the Bay Area Air Quality Plan and with the General Conformity rule (40 CFR parts 51 and 93) for ozone and CO under the relevant SIPs.

Described below are methodologies for impact indicators related to air quality resources, including specific

assumptions or details on methodologies.

Air Quality-Construction-Related Impacts. The BAAQMD has established thresholds of significance under CEQA for construction impacts. According to BAAQMD, fine particulate matter (PM10) is the pollutant of greatest concern with respect to construction activities (BAAQMD 1999). (BAAQMD noted that construction equipment do emit CO and other ozone precursors such as ROG, however, these emissions are included in the emission inventory that is the basis for regional air quality plans and would not generally be expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Bay Area.) BAAQMD has identified a set of feasible control measures for minimizing production of PM10 through construction activities, including Basic Measures for all construction sites and Enhanced Measures for larger construction sites (> 4 acres; BAAQMD 1999). If all of the control measures are implemented as appropriate for the size of the construction site, then BAAQMD has deemed that emissions from construction activities would be considered less than significant under CEQA.

Should control measures be not or only partially implemented, potential emissions of PM10 and other air pollutants emitted in the exhaust of construction equipment would need to be either estimated using area or gallon-based factors developed by BAAQMD (Table 8; BAAQMD 1999) or quantified based on the type and horsepower of equipment, number of days of operation or truck trips, number of control measures to be implemented, and average trip length, etc. Demolition of buildings also generates PM10 emissions, which BAAQMD notes can be estimated using the following emission factor: 0.00042 lbs PM10 per cubic feet of building volume (South Coast Air Quality Management District 1993 *in* BAAQMD 1999).

For the proposed project, impact thresholds were developed that incorporate both the potential for avoiding significant impacts through implementation of the appropriate control measures, as well as the potential for estimating air quality impacts through use of cubic yard-based estimation factors developed by BAAQMD (1999; Table 40). Park Service NEPA regulations require that impacts be analyzed within the context of a broad range of potential impact intensities (i.e., Negligible, Minor, Moderate, as well as Major or Substantial). The BAAQMD thresholds of significance are established for CEQA and, therefore, incorporate only a single threshold for those emission impacts that would be considered potentially "substantial" or "significant." To accommodate the broader context of impact evaluation in this document, thresholds of significance established by BAAQMD for project operations (see Project Operations – Carbon Monoxide and Total Emissions, Table 43 below) were divided by 3 to allow for characterization of Negligible, Minor, and Moderate, as well as Major or Substantial impacts from construction on air quality resources.

Table 46 presents the detailed results of potential estimated construction emissions from the various components of the proposed project, including restoration, public access, and Olema Marsh adaptive restoration. Based on the new anticipated construction schedule (see Chapter 2), emissions were calculated separately for each year of restoration implementation. While public access is anticipated to take two (2) years in most cases to construct, emissions are summed for total anticipated number of days, because a construction schedule has not been developed. As funding has not yet been secured, the public access component would most likely be constructed after restoration is completed. The elements of the Olema Marsh component that would be anticipated to be constructed at some point in the future as potential adaptive restoration options are also broken out from those anticipated to be potentially constructed as part of the initial restoration construction (e.g., Olema Creek frog ponds). As impact thresholds between the different pollutants were not necessarily similar, impacts are presented in Table 46, when necessary, as the range of impact intensity estimated for individual pollutants, as well as the median – or midpoint value – intensity.

Conformance with SIP ozone standards during construction is addressed through meeting BAAQMD standards for precursors that are most linked to formation of ozone at ground level – CO and ROG, with CO also independently considered a SIP maintenance pollutant in the SFAAB. Activities that do not cause levels of these pollutants to exceed BAAQMD significance thresholds are considered to be in conformance with the SIP. In addition, activities in which potentially significant or major emissions might occur, but they are mitigated to a less-than-significant or major level using approved BAAQMD mitigation measures, are also considered to be in conformance with the SIP.

TABLE 40. AIR QUALITY – ALL POLLUTANTS RELATED TO CONSTRUCTION EMISSIONS

Source: BAAQMD, Park Service Management Policies, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community, Regional (Marin Coast, Bay Area Air Basin) **Duration**: Construction

TABLE 40. AIR QUALITY – ALL POLLUTANTS RELATED TO CONSTRUCTION EMISSIONS

No Impact	There would be no potential for impact to air quality associated with implementation of the proposed project.
Negligible	There would be potential for impact, because implementation would involve use of construction equipment and vehicles used to transport personnel to and from the Project Area, however, impacts would be barely detectable, because: 1) all the appropriate control measures recommended by BAAQMD would be implemented; ***OR*** 2) estimated emissions from construction equipment would NOT exceed the following thresholds based on pounds per day: 1) PM10 (<27); 2) CO (<183); 3) ROG[1] (<27), 4) NOX (<27), and 5) SOX (<27).
Minor	There would be potential for measurable impact, because implementation would involve use of construction equipment and vehicles used to transport personnel to and from the Project Area, however, impacts would be relatively small, with estimated emissions from construction equipment falling in the following ranges based on pounds per day generated: 1) PM10 (27-53); 2) CO (183-367); 3) ROG (27-53), 4) NOX (27-53), and 5) SOX (27-53).
Moderate	There would be potential for impact, because implementation would involve use of construction equipment and vehicles used to transport personnel to and from the Project Area, and impacts would be appreciable, with estimated emissions from construction equipment falling in the following ranges based on pounds per day generated: 1) PM10 (54-80); 2) CO (368-550); 3) ROG (54-80), 4) NOX (54-80), and 5) SOX (54-80).
Major or Substantial	There would be potential for impact, because implementation would involve use of construction equipment and vehicles used to transport personnel to and from the Project Area, and impacts would be substantial or major, with estimated emissions from construction equipment exceeding the following thresholds based on pounds per day generated: 1) PM10 (>80); 2) CO (>550); 3) ROG (>80), 4) NOX (>80), and 5) SOX (>80).

Air Quality – Project-Related Impacts. The BAAQMD has also established thresholds of significance under CEQA for impacts related to project operation. The Thresholds of Significance established by BAAQMD assume that, for most of the proposed projects, motor vehicles traveling to and from the projects represent the primary source of air pollutant emissions associated with project operation (BAAQMD 1999). Project-related Thresholds of Significance have been developed for the following pollutants or combination of pollutants:

- Local Carbon Monoxide,
- Total Emissions (includes ROG, NOX, and PM10),
- Odors,
- Toxic Air Contaminants,
- Accidental Releases/Acutely Hazardous Air Emissions, and
- Cumulative Impacts.

These BAAQMD thresholds and the specific methodologies and assumptions developed for the proposed project are discussed in more detail below.

- ***The proposed project would not have any potential for Toxic Air Contaminants or Accidental Releases/Acutely Hazardous Air Emissions, so these criteria are not discussed further***.

Localized Carbon Monoxide Concentrations (BAAQMD 1999): Localized carbon monoxide concentrations should be estimated for projects in which: 1) vehicle emissions of CO would exceed 550 lb./day, 2) project traffic would impact intersections or roadway links operating at Level of Service (LOS) D, E or F **or** would cause LOS to decline to D, E or F, or 3) project traffic would increase traffic volumes on nearby roadways by 10 percent or more unless the increase in vehicle traffic volume is less than 100 vehicles per hour. A project contributing to CO concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million (ppm) averaged over 8 hours and 20 ppm for 1 hour would be considered to have substantial and therefore significant impact under CEQA.

Because potential air quality impacts posed by the proposed project would largely be related to increased visitation of the restored wetland and enhanced public access opportunities, traffic volumes were used as the criterion for impact thresholds, with the BAAQMD threshold divided by 3 to establish a broader range of impact thresholds for analyzing the intensity of the impact as required by Park Service NEPA regulations (Table 42). Estimated vehicle trips was generated by projecting future maximum or peak visitation to the Project Area based on the types of public access and public access structures, facilities, and uses and/or

[1] ROG=Reactive Organic Gas

attractions under the various alternatives relative to existing visitation rates to other major visitation areas within the park. Maximum or peak visitation was divided by 1.3 to reflect the assumption that approximately 70 percent of all visitors to the Project Area would be driving alone. A more complete description of these methodologies can be found in Chapter 3 under Visitor and Resident Experience. Maximum peak visitation assumed that all maximum numbers might potentially occur on the same day to ensure that a conservative estimate of impact is generated, but it is highly unlikely that maximum peak visitation for all facilities would occur simultaneously.

TABLE 41. AIR QUALITY – CARBON MONOXIDE – PROJECT-RELATED

Source: BAAQMD, Park Service Management Policies, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community, Regional (Marin Coast, Bay Area Air Basin) **Duration**: Long-Term	
No Impact	There would be no potential for impact to air quality from carbon monoxide associated with implementation of the proposed project.
Negligible	The proposed project would have negligible or barely measurable impact on air quality associated with carbon monoxide, because traffic volume on nearby roadways would NOT increase by more than 3 percent, and/or the increase would be less than 33 vehicles per hour.
Minor	The proposed project would have a small or slightly measurable impact on air quality associated with carbon monoxide, because the increase in traffic volume on nearby roadways would be greater than 3 percent, but less than 6 percent, and/or the increase would be between 33-66 vehicles per hour.
Moderate	The proposed project would have a moderate or measurable impact on air quality associated with carbon monoxide, because the increase in traffic volume on nearby roadways would be greater than 6 percent, but less than 9 percent, and/or the increase would be between 66-99 vehicles per hour.
Major or Substantial	The proposed project would have major or substantial impacts on air quality associated with carbon monoxide, because traffic volume on nearby roadways would increase by 10 percent or more, **and** the increase would be ≥ 100 vehicles per hour.

Total Emissions (BAAQMD 1999): Totals emissions from project operations need to be compared to the BAAQMD thresholds provided in Table 42, unless it meets some of the screening criteria identified below.

TABLE 42. BAAQMD CEQA THRESHOLDS OF SIGNIFICANCE FOR TOTAL EMISSIONS RESULTING FROM PROJECT OPERATIONS

Pollutant	ton/year	lb/day	kgm/day
ROG	15	80	36
NOX	15	80	36
PM10	15	80	36

To enable project proponents to determine whether a project may exceed the threshold of significance under CEQA for total emissions from project operations, BAAQMD has developed project screening criteria that are based on the threshold of significance for NOX (80 lbs/day). The criteria list screening thresholds for trip generation rate or size of project for various housing, retail, office, and other commercial and residential development projects. ***Generally, BAAQMD "does not recommend a detailed air quality analysis for projects generating less than 2,000 vehicle trips per day, unless warranted by the specific nature of the project or project setting***" (BAAQMD 1999). However, BAAQMD stresses that the screening criteria ***only address one threshold of significance and does not include other air quality issues such as carbon monoxide, odors, toxics, and cumulative impacts*** (BAAQMD 1999). Impact thresholds for this impact indicator are based on both the potential for the proposed project to generate less than 2,000 vehicle trips per day or on the project generating less than "substantial" or major amounts of ROG, NOX, and PM10 in pounds per day.

To establish a broad range of impact thresholds for evaluating the intensity of the impact as required Park Service NEPA regulations, projects with less than 2,000 vehicle trips per day were characterized as having negligible or minor impacts (Table 43). For moderate and major/substantial impacts, only BAAQMD total emissions criteria was used. As with other BAAQMD criteria, emissions thresholds for ROG, NOX, and PM10 were divided by 3 to develop a broader range of impact thresholds. Estimated vehicle trips was generated by projecting future maximum or peak visitation to the Project Area based on the types of public access and public access structures, facilities, and uses and/or attractions under the various alternatives relative to

existing visitation rates to other major visitation areas within the park. Maximum or peak visitation was divided by 1.3 to reflect the assumption that approximately 70 percent of all visitors to the Project Area would be driving alone. A more complete description of this methodology can be found in Chapter 3 under Visitor and Resident Experience. Maximum peak visitation assumed that all maximum numbers might potentially occur on the same day to ensure that a conservative estimate of impact is generated, but it is highly unlikely that maximum peak visitation for all facilities would occur simultaneously.

TABLE 43. AIR QUALITY – TOTAL EMISSIONS EFFECTS – PROJECT-RELATED

Source: BAAQMD, Park Service Management Policies, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community, Regional (Marin Coast, Bay Area Air Basin) **Duration**: Long-Term	
No Impact	There would be no potential for impact to air quality from total emissions associated with implementation of the proposed project.
Negligible	The proposed project would have a negligible or barely measurable effect on air quality associated with total emissions, because the number of trips generated would not exceed 1,000 vehicle trips per day; ***OR*** estimated vehicle-generated emissions would NOT exceed the following thresholds based on pounds per day generated: 1) PM10 (<27); 2) ROG (<27), and 3) NOX (<27).
Minor	The proposed project would have a minor or small impact on air quality associated with total emissions, because the number of trips generated would not exceed 2,000 vehicle trips per day; ***OR*** estimated vehicle-generated emissions would fall in the following ranges based on pounds per day generated: 1) PM10 (27-53); 2) ROG (27-53), and 3) NOX (27-53).
Moderate	The proposed project would have moderate impacts on air quality associated with total emissions, with estimated vehicle-generated emissions falling in the following ranges based on pounds per day generated: 1) PM10 (54-80); 2) ROG (54-80), and 3) NOX (54-80).
Major or Substantial	The proposed project would have substantial to major impacts on air quality associated total emissions, with estimated vehicle-generated emissions exceeding the following thresholds based on pounds per day generated: 1) PM10 (>80); 2) ROG (>80), and 3) NOX (>80).

Odors (BAAQMD 1999): Under CEQA, any project with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant impact. According to BAAQMD, odor impacts on residential areas and other sensitive receptors warrant the closest scrutiny, but consideration should also be given to other land uses where people may congregate, such as recreational facilities, worksites and commercial areas. BAAQMD requires that potential odor impacts should be evaluated for both of the following situations: 1) sources of odorous emissions being located near existing receptors, and 2) receptors such as housing developments being located near existing odor sources. The proposed project would have the potential to create or increase a source of odors, primarily odors associated with wetlands.

BAAQMD recommends that certain types of operations constructed within a set distance from sensitive receptors using establishing screening level distance criteria be subject to a more detailed analysis, including contacting BAAQMD regarding potential odor complaints (BAAQMD 1999). Most of these facilities for which screening level distances have been established are operations such as wastewater treatment plants, sanitary landfills, and petroleum refineries. There are no established screening level distances for wetlands, restoration projects, or agricultural activities in the BAAQMD guidelines (BAAQMD 1999). As of 2002, there was only one large stationary source of odors in West Marin for which complaints had been received, which appeared to be associated with the now closed West Marin landfill (Illingworth & Rodkin and Nichols Berman 2002). Members of the local community have voiced objections during the scoping period and afterwards to the smell of manure emanating from the Giacomini Ranch dairy facility: any formal complaints regarding this may have been lodged with County of Marin rather than BAAQMD. BAAQMD provides no quantitative or qualitative thresholds of significance under CEQA for odors. Because odors are difficult to quantify, impact thresholds attempt to qualitatively estimate the potential impact of the proposed project on nearby sensitive receptors (Table 44).

TABLE 44. AIR QUALITY – ODORS

Source: BAAQMD, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no potential for impact to air quality from odors associated with the proposed project.
Negligible	The proposed project would generate odors that would be barely detectable by sensitive receptors (e.g., adjacent residential and commercial development and park visitors).
Minor	The proposed project would generate odors that would be noticeable by sensitive receptors (e.g., adjacent residential and commercial development and park visitors), but not objectionable.
Moderate	The proposed project would generate odors that would be noticeable by sensitive receptors (e.g., adjacent residential and commercial development and park visitors) and slightly objectionable.
Major or Substantial	The proposed project would generate odors that would be major and strikingly apparent by sensitive receptors (e.g., adjacent residential and commercial development and park visitors) and moderately to highly objectionable such that a complaint is lodged with BAAQMD or the County of Marin.

Cumulative Air Quality Impacts (BAAQMD 1999): BAAQMD provides some additional guidance on evaluating cumulative air quality impacts under CEQA. Any proposed project that individually has a significant air quality impact on the Bay Area Air Basin would also be considered by BAAQMD to have a cumulatively significant air quality impact under CEQA. Those projects that do not individually have significant impacts would be considered to not cumulatively have significant impacts if the proposed project is consistent with the local general plan **and** the general plan of the regional air quality plan, in this case, the Clean Air Plan (BAAQMD 1999). The local general plan for the appropriate city or county must be consistent with the Clean Air Plan for this guideline to apply (BAAQMD 1999). The Marin CWP is consistent with the Clean Air Plan (Illingworth & Rodkin and Nichols Berman 2002).

Impact Analysis

TABLE 45. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR AIR QUALITY RESOURCES

All impacts would be considered Adverse (unless otherwise noted) and Regional and are separately analyzed for Construction and Short-Term/Long-Term, with the exception of Odors, which would be considered a Local Community impact and is analyzed for Short- and Long-Term. Entries with a slash refer to range of impact intensities estimated for individual pollutants, with median boldfaced.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Air Pollutants – Construction Emissions	Negligible	**Negligible**/ Moderate (Yr 1)*	**Negligible**/ Minor*	**Negligible**/ Moderate* - Minor**	**Negligible**/ Moderate (Yr 1)* / Major (Yr 2)* -MInor **
NEPA: Intensity Following Mitigation					Moderate (Yr 2)*
CEQA: Significance Following Mitigation					Less than Significant (Yr 2)*
Air Pollutants – Project-Generated Carbon Monoxide Emissions	Negligible	Minor	Minor	Negligible	Negligible
Air Pollutants – Project-Generated Total Emissions	Negligible	Negligible	Negligible	Negligible	Negligible
Odors – Construction/Short-Term	Beneficial - Minor	Adverse - Negligible	Adverse - Negligible	Adverse- Moderate	Adverse- Moderate
Odors – Long-Term	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor

* NOX production
** CO production

TABLE 46. ESTIMATED EMISSIONS OF POLLUTANTS DURING CONSTRUCTION BASED ON CUBIC YARDS OF EARTHMOVING

Project has been separated into construction years where a preliminary scheduling of construction activities has been conducted.

No Action			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	3,738	***Grams***	8,223.60	515,844.00	34,389.60	158,491.20	17,194.80
		Pounds	18.09	1,134.86	75.66	348.68	37.83
Construction Days	57	***Lbs/Day***	0.32	19.91	1.33	6.12	0.66
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative A - Yr 1			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	52,543	***Grams***	115,594.60	7,250,934.00	483,395.60	2,227,823.20	241,697.80
		Pounds	311.01	15,952.05	1,063.47	4,901.21	531.74
Construction Days	90	***Lbs/Day***	3.46	177.25	11.82	54.46	5.91
		Impact	Negligible	Negligible	Negligible	Moderate	Negligible
Alternative A - Yr 2			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	40,063	***Grams***	88,138.60	5,528,694.00	368,579.60	1,698,671.20	184,289.80
		Pounds	193.90	12,163.13	810.88	3,737.08	405.44
Construction Days	184	***Lbs/Day***	1.05	66.10	4.41	20.31	2.20
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative A - Public Access			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	16,833	***Grams***	37,032.60	2,322,954.00	154,863.60	713,719.20	77,431.80
		Pounds	81.47	5,110.50	340.70	1,570.18	170.35
Construction Days	270	***Lbs/Day***	0.30	18.93	1.26	5.82	0.63
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative B - Yr 1			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	46,906	***Grams***	103,193.20	6,473,028.00	431,535.20	1,988,814.40	215,767.60
		Pounds	283.73	14,240.66	949.38	4,375.39	474.69
Construction Days	90	***Lbs/Day***	3.15	158.23	10.55	48.62	5.27
		Impact	Negligible	Negligible	Negligible	Minor	Negligible
Alternative B - Yr 2			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	98,718	***Grams***	217,179.60	13,623,084.00	908,205.60	4,185,643.20	454,102.80
		Pounds	477.80	29,970.78	1,998.05	9,208.42	999.03
Construction Days	184	***Lbs/Day***	2.60	162.88	10.86	50.05	5.43
		Impact	Negligible	Negligible	Negligible	Minor	Negligible
Alternative B - Public Access			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	1,792	***Grams***	3,942.40	247,296.00	16,486.40	75,980.80	8,243.20
		Pounds	8.67	544.05	36.27	167.16	18.14
Construction Days	270	***Lbs/Day***	0.03	2.02	0.13	0.62	0.07
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative C - Yr 1			*PM10 (gm/yd3)*	*CO (gm/yd3)*	*ROG (gm/yd3)*	*NOX (gm/yd3)*	*SOX (gm/yd3)*
Earthmoving	58,222	***Grams***	128,088.40	8,034,636.00	535,642.40	2,468,612.80	267,821.20
		Pounds	338.49	17,676.20	1,178.41	5,430.95	589.21
Construction Days	90	***Lbs/Day***	3.76	196.40	13.09	60.34	6.55
		Impact	Negligible	Minor	Negligible	Moderate	Negligible
Alternative C - Yr 2			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	147,979	***Grams***	325,553.80	20,421,102.00	1,361,406.80	6,274,309.60	680,703.40
		Pounds	716.22	44,926.42	2,995.09	13,803.48	1,497.55
Construction Days	184	***Lbs/Day***	3.89	244.17	16.28	75.02	8.14
		Impact	Negligible	Minor	Negligible	Moderate	Negligible
Alternative C - Olema Marsh			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	5,142	***Grams***	11,312.40	709,596.00	47,306.40	218,020.80	23,653.20
		Pounds	24.89	1,561.11	104.07	479.65	52.04
Construction Days	75	***Lbs/Day***	0.33	20.81	1.39	6.40	0.69
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative C - Public Access			*PM10 (gm/yd3)*	*CO (gm/yd3)*	*ROG (gm/yd3)*	*NOX (gm/yd3)*	*SOX (gm/yd3)*
Earthmoving	1,235	***Grams***	2,717.00	170,430.00	11,362.00	52,364.00	5,681.00
		Pounds	5.98	374.95	25.00	115.20	12.50
Construction Days	270	***Lbs/Day***	0.02	1.39	0.09	0.43	0.05
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative D - Yr 1			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	60,757	***Grams***	133,665.40	8,384,466.00	558,964.40	2,576,096.80	279,482.20
		Pounds	350.76	18,445.83	1,229.72	5,667.41	614.86
Construction Days	90	***Lbs/Day***	3.90	204.95	13.66	62.97	6.83
		Impact	Negligible	Minor	Negligible	Moderate	Negligible
Alternative D - Yr 2			*PM10 (gm/yd3)*	*CO (gm/yd3)*	*ROG (gm/yd3)*	*NOX (gm/yd3)*	*SOX (gm/yd3)*
Earthmoving	194,426	***Grams***	427,737.20	26,830,788.00	1,788,719.20	8,243,662.40	894,359.60
		Pounds	941.02	59,027.73	3,935.18	18,136.06	1,967.59
Construction Days	214	***Lbs/Day***	4.40	275.83	18.39	84.75	9.19
		Impact	Negligible	Minor	Negligible	Major	Negligible
Alternative D - Olema Marsh			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	5,142	***Grams***	11,312.40	709,596.00	47,306.40	218,020.80	23,653.20
		Pounds	24.89	1,561.11	104.07	479.65	52.04
Construction Days	75	***Lbs/Day***	0.33	20.81	1.39	6.40	0.69
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible
Alternative D - Public Access			PM10 (gm/yd3)	CO (gm/yd3)	ROG (gm/yd3)	NOX (gm/yd3)	SOX (gm/yd3)
Earthmoving	975	***Grams***	2,145.00	134,550.00	8,970.00	41,340.00	4,485.00
		Pounds	4.72	296.01	19.73	90.95	9.87
Construction Days	270	***Lbs/Day***	0.02	1.10	0.07	0.34	0.04
		Impact	Negligible	Negligible	Negligible	Negligible	Negligible

No Action Alternative

Analysis: The No Action Alternative would generally have negligible effects on air quality both during construction and after the proposed project was implemented and would be in conformance with the applicable SIPs for ozone and CO (Table 45; Table 46). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. (The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch.) The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no construction of new public access facilities. With closure of the dairy in 2007 as specified in the Park Service's purchase agreement with the Giacomini family, agricultural management would largely be discontinued, although there would be a possibility for leased grazing through a separate environmental review process.

Emissions-Construction: The minor amount of grading that would be conducted as part of the 11-acre wetland restoration component would result in only negligible amounts of particulate matter (PM10), carbon monoxide (CO), sulfur dioxide (SOX), reactive organic gasses (ROG), and nitrogen dioxide (NOX) being generated from emissions of earthmoving equipment, with all pollutants considerably below threshold levels (Table 46). Recent monitoring by the Park Service found no exceedances for ozone at the Seashore under either the California or federal standard (Sullivan et al. 2001). In fact, visibility at the Seashore improved during the period of 1996 to 1999 primarily due to a decrease in nitrate particulates, a major component of visibility blocking material in coastal California. Particulate nitrate is formed from nitrogen oxide and hydrocarbon gases emitted into the atmosphere from fires, diesel engines, and other sources (Malm 2000).

Emissions-Project Implementation: After construction is completed, pollutant production would be limited to emissions associated with personal vehicles used by visitors and residents to access existing public access facilities; earthmoving equipment used to dredge some of the Inverness Ridge drainages to maintain hydraulic capacity for flood control purposes; and, should leased grazing be approved in the future, trucks used to haul cattle to and from the Giacomini Ranch. The post-project implementation actions would be expected to have negligible effects on carbon monoxide (CO) and other emission pollutants, with estimated hourly maximum or peak traffic volume estimated at less than the 33 vehicles-per-hour and 1,000 vehicles—per-day thresholds established for negligible. These maximum or peak volume traffic estimates represent conservative or cautious estimates that err on the side of overestimating impacts such that the maximum or peak for each of the public access facilities is assumed to occur simultaneously, which is unlikely.

Odors: In terms of odor, this alternative would have a minor beneficial effect on odors, because land use would switch from an intensively managed dairy to open space and/or leased grazing, which would be expected to have less odors in both the short- and long-term. As noted earlier, members of the local community have voiced objections during the scoping period and afterwards to the smell of manure emanating from the Giacomini Ranch dairy facility.

Conformity: The No Action Alternative would be considered to be in conformity with SIPs for ozone and CO. Emissions of ROG and CO would be negligible during both construction and project implementation.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: There are only three (3) currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented. These would be the proposed land exchange between the Park Service and the Giacomini family, Sir Francis Drake Boulevard Repaving Project, and the Culvert Cleaning near Olema Marsh, all of which are proposed for implementation in fall 2007. As part of the proposed land exchange, buildings would be removed from the Dairy facility: these removal efforts would generate additional emissions. It is likely that the proposed building removal would be conducted prior to implementation of restoration, however, in the event that removal efforts are delayed, the construction emissions numbers in Table 46 have been adjusted to take into account emissions generated from building removal. The County has tentatively planned to schedule the road

repaving project after hauling for the proposed project would be completed (M. Madayag, County of Marin Department of Public Works, *pers. comm*.), so it is likely that construction schedules would be staggered to some degree and not directly overlap. Should the culvert cleaning move forward in fall 2007, it is unlikely that the scale of the proposed cleaning efforts would raise cumulative emissions above the negligible level.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The No Action alternative would result generally in negligible air quality impacts from construction and project implementation and would represent a minor beneficial effect on odors in the local community with conversion from the dairy to either open space and/or leased grazing uses. It would be in conformance with the General Conformity Rule in that it would not exceed emissions thresholds established under SIPs for improvement of ozone and maintenance of CO in the Bay Area Air Basin, even with implementation of other small-scale projects in the vicinity. The only construction would be a small restoration component that is required under the Park Service's existing mitigation agreement with CalTrans, and project-related effects would be limited to vehicles and trucks associated with visitors and residents using existing public access facilities, flood control-related maintenance, and livestock transport.

Alternative A

Analysis: The effects of Alternative A on air quality would generally range from negligible to moderate during construction and negligible to minor effects after implementation and would be in conformance with the applicable SIPs for ozone and CO (Table 45, Table 46). Under Alternative A, restoration occurs in the East Pasture of the Giacomini Ranch, with construction of new public access facilities limited to the eastern and southern perimeters of the East Pasture. There are no restoration or public access components in the West Pasture or Olema Marsh, except for the potential future extension of the southern perimeter trail to Inverness Park.

Emissions-Construction: Construction activities for both restoration and public access in the East Pasture would be estimated to involve approximately more than 110,000 cubic yards of earthmoving (Table 46). Since release of the DEIS/EIR, construction schedules have changed, such that construction of the restoration component is now anticipated to take two (2) construction seasons. The first construction season would involve moving of approximately 52,550 cubic yards of earth and would be conducted during approximately a 90-day period. During this first construction season, approximately 5,000 cubic yards of building materials may be moved as part of a separate Park Service project, the land exchange (Residential Home Development; C Street, Point Reyes Station; Table 46). The second construction season would involve moving of approximately 40,100 cubic yards of earth and would be conducted during approximately a 184-day period. The public access component would be constructed after restoration is completed and is estimated to take two (2) construction seasons. It would generate approximately 17,000 cubic yards of earthmoving. In addition, there is a potential for the future trail extension to Inverness Park under this alternative, which could be constructed by either widening the Sir Francis Drake Boulevard road berm or by placing a boardwalk in the West Pasture. The former would require some earthmoving. Excavation, fill, and grading actions would result in only negligible amounts of particulate matter (PM10), reactive organic gasses (ROG), sulfur dioxide (SOX), and carbon monoxide (CO), and negligible (Year 2) to moderate (Year 1) amounts of nitrogen dioxide (NOX) being generated from emissions of earthmoving equipment. Moderate amounts of NOX generated during Year 1 would come from implementation of the more earthmoving-intensive operation such as shallow excavation of the concentrated manure disposal pasture and filling of the manure storage ponds.

Emissions-Project Implementation: After construction is completed, pollutants would be produced primarily from emissions associated with personal vehicles used by visitors and residents to access existing public access facilities and, to a much lesser extent, earthmoving equipment used to dredge some of the Inverness Ridge drainages to maintain hydraulic capacity for flood control purposes. These actions may have minor effects on carbon monoxide (CO), with estimated hourly maximum or peak traffic volumes associated less than 66 vehicles per hour. These maximum or peak volume traffic estimates represent conservative or cautious estimates that err on the side of overestimating impacts such that the maximum or peak for each of the public access facilities is assumed to occur simultaneously, which is unlikely. This alternative may have a negligible effect on Total Emissions, with maximum or peak daily vehicular traffic below 1,000 vehicles per day.

Conformity: Alternative A would be considered to be in conformity with SIPs for ozone and CO. Emissions of ROG and CO would be negligible during both construction and project implementation.

Odors: In terms of odor, this alternative would have a minor beneficial effect on odors, because land use would switch from an intensively managed dairy to open space, which would be expected to have fewer odors over the long-term. As noted earlier, members of the local community have voiced objections during and after the scoping period to the smell of manure emanating from the Giacomini Ranch Dairy facility. During construction and over the short-term, there may be a negligible adverse impact associated with disturbance of wetland and agricultural soils. At least one of the odors associated with wetlands is a "rotten egg" smell produced by hydrogen sulfides, but this is typically a localized smell that occurs when sediments are disturbed by people walking or digging in the mud. However, it is possible that, during the construction period, when wet soils are excavated, these types of odors might be magnified at least temporarily. In addition, excavation and grading related to removal of agricultural wastes such as manure may also temporarily increase agricultural odors in the Project Area vicinity.

Possible Additional Mitigation Measures: Based on the revised construction schedule, construction activities during restoration would potentially generate only negligible to at most moderate (NOX) amounts of emissions from earthmoving equipment. Therefore, mitigation would not be required, although many of the mitigation measures proposed previously in the DEIS/EIR under Alternatives A-C to reduce emissions below Major or Substantial levels would be implemented anyways because of mitigation measures proposed to reduce the impacts of noise to sensitive receptors in sensitive construction zones during construction (See Air Resources – Noise and Soundscapes). In addition, PM10 emissions would be minimized by watering down construction areas and hauling routes, where feasible, and washing tires of hauling trucks before they exit Project Area. No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: No formal mitigation measures would be proposed under this alternative.

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative A on air quality during construction and after implementation would generally range from negligible to moderate. It would be in conformance with the General Conformity Rule in that it would not exceed emissions thresholds established under SIPs for improvement of ozone and maintenance of CO in the Bay Area Air Basin, even with implementation of other small-scale projects in the vicinity. Under this alternative, the East Pasture of the Giacomini Ranch would be restored, with construction of new public access facilities limited to the eastern and southern perimeter of the East Pasture. Project-related effects would involve primarily emissions from vehicles and trucks associated with visitors and residents using existing public access facilities, as well as, to a lesser degree, flood control-related maintenance. Based on the number of maximum or peak vehicles projected on an hourly or daily basis, these effects would be negligible (total emissions) to minor (carbon monoxide). This alternative would have a long-term minor beneficial effect on odors in the local community with conversion from the dairy to either open space or grazed lands, although there may be some negligible adverse effects during construction and over the short-term associated with disturbance of wetland soils and soils with high concentrations of manure.

Alternative B

Analysis: The effects of Alternative B on air quality during construction and after implementation would generally range from negligible to major or substantial and would be in conformance with the applicable SIPs for ozone and CO (Table 42; Table 46). Under Alternative B, restoration occurs in both the East and West Pastures of the Giacomini Ranch, with most of the construction of new public access facilities limited to the eastern and southern perimeters of the East Pasture.

Emissions-Construction: Construction activities for both restoration and public access would be estimated to involve more than approximately 142,000 cubic yards of earthmoving (Table 46). Since release of the DEIS/EIR, construction schedules have changed in terms of the order in which components would be

constructed during certain seasons. The first construction season would involve moving of approximately 47,000 cubic yards of earth and would be conducted during approximately a 90-day period. During this first construction season, approximately 5,000 cubic yards of building materials may be moved as part of a separate Park Service project, the land exchange (Residential Home Development; C Street, Point Reyes Station; Table 46). The second construction season would involve moving of approximately 100,000 cubic yards of earth and would be conducted during approximately a 184-day period. The public access component would be constructed after restoration is completed and is estimated to take two (2) construction seasons. It would generate approximately 1,800 cubic yards of earthmoving. In addition, there is still potential for the future trail extension to Inverness Park under this alternative, which could be constructed by either widening the Sir Francis Drake Boulevard road berm or by placing a boardwalk in the West Pasture. The former would require some earthmoving. In general, earthmoving associated with public access would be reduced under Alternative B relative to Alternative A, because the eastern perimeter trail would involve construction of a boardwalk rather than importation of fill for a culverted dirt trail.

Relative to the construction schedule proposed under the DEIS/EIR, the new construction schedule actually reduces the intensity of impacts. Excavation, fill, and grading actions would result in only negligible amounts of most emissions being generated by earthmoving equipment, although there would be the potential for minor NOX emissions. The intensity of NOX emissions would be reduced relative to Alternative A, because excavation and disposal of the concentrated manure disposal pasture soils would be conducted in Year 2 rather than Year 1, and there would be less overlap of this earthmoving-intensive element with other earthmoving activities.

Emissions-Project Implementation: Alternative B would have very similar effects to Alternative A on air quality after project implementation. The minimal amount of public access-related vehicle trips and maintenance-related use of earthmoving equipment would have only negligible effects on carbon monoxide (CO) and Total Emissions of other pollutants.

Odors: In terms of odor, this alternative would have a minor beneficial effect on odors similar to Alternative A, because land use would switch from an intensively managed dairy to open space, which would be expected to have fewer odors over the long-term.

Conformity: Alternative B would be considered to be in conformity with SIPs for ozone and CO. Emissions of ROG and CO would be negligible during both construction and project implementation.

Proposed Mitigation Measures: Based on the revised construction schedule, construction activities during restoration would potentially generate only negligible to at most minor (NOX) amounts of emissions from earthmoving equipment. Therefore, mitigation would no longer be required, although many of the mitigation measures proposed previously in the DEIS/EIR under this alternative to reduce emissions below Major or Substantial levels would be implemented anyways because of mitigation measures proposed to reduce the impacts of noise to sensitive receptors in sensitive construction zones during construction (See Air Resources – Noise and Soundscapes). In addition, PM10 emissions would be minimized by watering down construction areas and hauling routes, where feasible, and washing tires of hauling trucks before they exit Project Area.

Effectiveness of Proposed Mitigation Measures: No formal mitigation measures would be proposed under this alternative.

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative B on air quality during construction and after implementation would range generally from negligible to minor (NOX). It would be in conformance with the General Conformity Rule in that it would not exceed emissions thresholds established under SIPs for improvement of ozone and maintenance of CO in the Bay Area Air Basin, even with implementation of other small-scale projects in the vicinity. Relative to the construction schedule proposed under the DEIS/EIR, the new construction schedule actually reduces the intensity of impacts. Excavation, fill, and grading actions would result in only negligible amounts of most emissions being generated by earthmoving equipment, although there would be the potential for minor NOX emissions. The intensity of NOX emissions would be reduced relative to Alternative A,

because excavation and disposal of the concentrated manure disposal pasture soils would be conducted in Year 2 rather than Year 1, and there would be less overlap of this earthmoving-intensive element with other earthmoving activities. Because of the reduction in impacts with the revised schedule, mitigation would no longer be required, although many of the mitigation measures proposed previously in the DEIS/EIR under this alternative to reduce emissions below Major or Substantial levels would be implemented anyways because of mitigation measures proposed to reduce the impacts of noise to sensitive receptors in sensitive construction zones during construction (See Air Resources – Noise and Soundscapes).

Project-related effects would involve primarily emissions from vehicles and trucks associated with visitors and residents using existing public access facilities, as well as, to a much lesser degree, flood control-related maintenance. Based on the number of maximum or peak vehicles projected on an hourly or daily basis, effects would be negligible for both carbon monoxide and total emissions. This alternative would have a long-term minor beneficial effect on odors in the local community with conversion from the dairy to either open space or grazing land, although there may be some negligible adverse effects during construction and over the short-term after implementation associated with disturbance of wetland and heavily manured soils.

Alternative C

Analysis: Alternative C would have similar, generally negligible to minor effects on air quality during construction and after implementation as Alternative B. Under Alternative C, restoration occurs in the East and West Pastures of the Giacomini Ranch and Olema Marsh. As with the other alternatives, most of the construction of new public access facilities is limited to the eastern and southern perimeters of the East Pasture, although the amount of public access on the eastern perimeter is scaled back. Because of the increase in restoration efforts, the intensity of construction-related NOX and CO emissions could increase from minor and negligible, respectively, under Alternative B to moderate and minor under Alternative C (Table 42; Table 46). Conversely, the intensity of project-related CO emissions would generally be expected to decrease from minor to negligible. However, odors during construction and over the short-term following implementation could increase under Alternative C from negligible (Alternative B) to moderate, because of restoration efforts in Olema Marsh.

Emissions-Construction: Construction activities for both restoration and public access would be estimated to involve more than approximately 220,000 cubic yards of earthmoving (Table 46). Since release of the DEIS/EIR, estimates of earthmoving and construction schedules have been refined to take into account improved designs for the Olema Marsh component, as well as changes in the order in which components would be constructed during each of the two (2) construction seasons. The first construction season would involve moving of approximately 59,000 cubic yards of earth and would be conducted during approximately a 90-day period. This season incorporates construction of Olema Creek frog ponds as part of the Olema Marsh adaptive restoration component. In addition, during this first construction season, approximately 5,000 cubic yards of building materials may be moved as part of a separate Park Service project, the land exchange (Residential Home Development; C Street, Point Reyes Station; Table 46). The second construction season would involve moving of approximately 150,000 cubic yards of earth and would be conducted during approximately a 184-day period. The public access component would be constructed after restoration is completed and is estimated to take two (2) construction seasons. It would involve approximately 1,200 cubic yards of earthmoving. In addition, there is still potential for the future trail extension to Inverness Park under this alternative, which could be constructed by either widening the Sir Francis Drake Boulevard road berm or by placing a boardwalk in the West Pasture. The former would require some earthmoving. In general, earthmoving associated with public access would be reduced under Alternative C relative to Alternative B, because there would be no through trail construction on the eastern perimeter. Most of the Olema Marsh restoration component is designed as an adaptive restoration approach and so would, therefore, be phased to occur at some point in the future after – and if – some of the initial restoration elements are implemented. Implementation of some of these future adaptive restoration elements would result in approximately 5,150 cubic yards of earthmoving.

Relative to the construction schedule proposed under the DEIS/EIR, the new construction schedule actually reduces the intensity of impacts despite the increase in earthmoving estimates. Excavation, fill, and grading actions would result in only negligible amounts of most emissions being generated by earthmoving equipment, although there would be the potential for minor CO and moderate NOX emissions during both construction years. The intensity of NOX emissions in Year 1 would increase relative to Alternative B, because of construction of the Olema Creek frog ponds and other potential Olema Marsh restoration elements.

Emissions-Project Implementation: Alternative C would have very similar effects to Alternative B on air quality after project implementation. After construction is completed, pollutants would be produced primarily from emissions associated with personal vehicles used by visitors and residents to access existing public access facilities and, to a much lesser extent, earthmoving equipment used to dredge some of the Inverness Ridge drainages to maintain hydraulic capacity for flood control purposes. These actions may have negligible effects on both carbon monoxide (CO) and emissions of other pollutants. Hourly maximum or peak volume traffic is estimated at approximately 23 vehicles per hour or approximately 230 vehicles per day, below the 33 vehicle-per-hour and 1,000 vehicle-per-day thresholds for negligible under carbon monoxide and other emissions impact indicators, respectively. These maximum or peak volume traffic estimates represent conservative or cautious estimates that err on the side of overestimating impacts such that the maximum or peak for each of the public access facilities is assumed to occur simultaneously, which is unlikely.

Odors: In terms of odor, this alternative would have a minor beneficial effect on odors over the long-term, because land use would switch from an intensively managed dairy to open space, which would be expected to have fewer odors over the long-term. Members of the local community have voiced objections during and after the scoping period to the smell of manure emanating from the Giacomini Ranch dairy facility. During construction and over the short-term, there may be a moderate adverse impact associated with disturbance of wetland and agricultural soils in Giacomini Ranch and Olema Marsh. In addition to the potential odors generated by excavation of wetland and heavily manured soils in the Giacomini Ranch discussed under Alternative A, the Olema Marsh restoration component also has the potential to generate adverse odors during construction and over the short-term after implementation, because lowering of water surface levels within the impounded marsh would cause oxidation of peat soils and breakdown of organic matter. The decaying organic matter, combined with odors generated by chemical reactions within the soil such as hydrogen sulfides, may cause noticeable and slightly objectionable odors in the vicinity of the marsh until the marsh comes into equilibrium with new water surface level conditions. Phasing of the project through adaptive restoration would help to ameliorate the severity of odor problems by staggering periods of major drainage and organic matter decomposition.

Conformity: Alternative C would be considered to be in conformity with SIPs for ozone and CO. While there would be minor emissions of CO during both construction seasons, ROG emissions would remain negligible. These emissions would not be expected to be out of conformance with SIP or to cause the Bay Area Air Basin to become out of compliance with the SIPs.

Proposed Mitigation Measures: Based on the revised construction schedule, construction activities during restoration would potentially generate only negligible to moderate (NOX) amounts of emissions from earthmoving equipment. Therefore, mitigation would no longer be required, although many of the mitigation measures proposed previously in the DEIS/EIR under this alternative to reduce emissions below Major or Substantial levels would be implemented anyways because of mitigation measures proposed to reduce the impacts of noise to sensitive receptors in sensitive construction zones during construction (See Air Resources – Noise and Soundscapes). Specifically, contractors would be required to: 1) minimize idling time to 5 minutes; 2) maintain properly tuned equipment; and 3) limit the hours of operation of heavy duty equipment or the number of pieces of equipment operating simultaneously. In addition, PM10 emissions would be minimized by watering down construction areas and hauling routes, where feasible, and washing tires of hauling trucks before they exit Project Area.

Effectiveness of Proposed Mitigation Measures: No formal mitigation measures would be proposed under this alternative.

Cumulative Impacts: Cumulative impacts would generally be the same as described under the No Action Alternative. Based on the estimated pounds of emissions generated per day under construction Year 1 (Table 46), concurrent implementation of any of the three (3) relatively small proposed or reasonably foreseeable projects discussed under the No Action Alternative would not have the potential to cumulatively contribute to an increase in NOX emissions that would exceed BAAQMD's thresholds for substantial or significant impacts, particularly as the numbers in Table 46 have been adjusted to take into account emissions generated from building removal as part of the proposed land exchange between the Park Service and the Giacomini family.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative C on air quality during construction and after implementation would generally be similar to Alternative B, with the intensity of effects ranging from negligible to moderate, although CO and NOX emissions and short-term odors could increase in intensity. This alternative would be in conformance with the General Conformity Rule in that it would not exceed emissions thresholds established under SIPs for improvement of ozone and maintenance of CO in the Bay Area Air Basin, even with implementation of other small-scale projects in the vicinity. Relative to the construction schedule proposed under the DEIS/EIR, the new construction schedule actually reduces the intensity of impacts, even though estimates for the total amount of earthmoving increased relative to those generated in the DEIS/EIR. These changes resulted from refinement in earthmoving estimates, as well as for designs for the Olema Marsh restoration component. Excavation, fill, and grading actions would result in only negligible amounts of most emissions being generated by earthmoving equipment, although there would be the potential for minor CO and moderate NOX emissions during both construction years and more odor over the short-term from construction in Olema Marsh. NOX emissions during Year 1 would increase relative to Alternative B because of construction of the Olema Creek frog ponds. Because of the reduction in impacts with the revised schedule, mitigation would no longer be required, although many of the mitigation measures proposed previously in the DEIS/EIR under this alternative to reduce emissions below Major or Substantial levels would be implemented anyways because of mitigation measures proposed to reduce the impacts of noise to sensitive receptors in sensitive construction zones during construction (See Air Resources – Noise and Soundscapes).

Project-related effects would involve primarily emissions from vehicles and trucks associated with visitors and residents using existing public access facilities, as well as, to a much lesser degree, flood control-related maintenance. Based on the number of maximum or peak vehicles projected on an hourly or daily basis, effects would be negligible for both carbon monoxide and Total Emissions. This alternative would have a long-term minor beneficial effect on odors in the local community with conversion from the dairy to either open space or grazing land. However, there may be some moderate adverse effects during construction and over the short-term after implementation associated with excavation-related disturbance of wetland and heavily manured soils in the Giacomini Ranch and drainage-related decomposition of organic matter and related chemical changes of Olema Marsh soils.

Alternative D

Analysis: Alternative D would generally have similar negligible to minor effects on air quality during construction and after implementation as Alternative C, although NOX emissions could increase in intensity during the second year of construction. Under Alternative D, restoration occurs in the East and West Pastures of the Giacomini Ranch and Olema Marsh, with expanded restoration efforts in the East Pasture. As with the other alternatives, most of the construction of new public access facilities is limited to the eastern and southern perimeters of the East Pasture, although the amount of public access on the eastern and southern perimeters is scaled back considerably. Because of the increase in restoration efforts, the intensity of NOX emissions could increase from moderate under Alternative B to major or substantial under Alternative C during Year 2 of restoration implementation (Table 42; Table 46). The "substantial" amount of NOX potentially emitted, which was estimated from the amount of cubic yards of earth moved during the second year of construction, would represent a significant impact under CEQA according to BAAQMD CEQA guidelines (1999), however, these impacts would be mitigated to less-than-significant under CEQA and moderate under NEPA using mitigation measures proposed by BAAQMD (1999). With implementation of these BAAQMD-approved mitigation measures, this alternative would be expected to be in conformance with the General Conformity Rule in that it would not exceed emissions thresholds established under SIPs for improvement of ozone and maintenance of CO in the Bay Area Air Basin, even with implementation of other small-scale projects in the vicinity.

Emissions-Construction: Construction activities for both restoration and public access would be estimated to involve more than approximately 270,000 cubic yards of earthmoving (Table 46). Since release of the DEIS/EIR, estimates of earthmoving and construction schedules have been refined to take into account improved designs for the Olema Marsh component, as well as changes in the order in which components would be constructed during each of the two (2) construction seasons.

The first construction season would involve moving of approximately 61,000 cubic yards of earth and would be conducted during approximately a 90-day period. This season incorporates construction of Olema Creek frog ponds as part of the Olema Marsh adaptive restoration component. In addition, during this first construction season, approximately 5,000 cubic yards of building materials may be moved as part of a separate Park

Service project, the land exchange (Residential Home Development; C Street, Point Reyes Station; Table 46). The second construction season would involve moving of approximately 195,000 cubic yards of earth and would be conducted during approximately a 210-day period, with construction starting a month earlier than under Alternative C to enable completion of all restoration components. The public access component would be constructed after restoration is completed and is estimated to take two (2) construction seasons. It would involve approximately 1,000 cubic yards of earthmoving, including earthmoving for an ADA-compliant trail that was incorporated into this alternative in the FEIS/EIR. In addition, unlike Alternative D as proposed in the DEIS/EIR, there is still potential for the future trail extension to Inverness Park under this alternative, which could be constructed by either widening the Sir Francis Drake Boulevard road berm or by placing a boardwalk in the West Pasture. The former would require some earthmoving. In general, earthmoving associated with public access would be reduced under Alternative D relative to Alternative C, because there would be no through trail construction on the southern perimeter and only one spur trail on the eastern perimeter. Most of the Olema Marsh restoration component is designed as an adaptive restoration approach and so would, therefore, be phased to occur at some point in the future after – and if – some of the initial restoration elements are implemented. Implementation of some of these future adaptive restoration elements would result in approximately 5,150 cubic yards of earthmoving. Replacement of the Tomasini Creek culvert would also most likely occur after restoration is implemented, but would be expected to generate less than 800 cubic yards of earthmoving.

Relative to the construction schedule proposed under the DEIS/EIR for Alternative D, the new construction schedule does not greatly alter the intensity of impacts despite the increase in earthmoving estimates. Excavation, fill, and grading actions would result in only negligible amounts of most emissions being generated by earthmoving equipment, although there would be the potential for minor CO emissions during both years of construction and moderate NOX emissions during Year 1, with potentially major or substantial NOX emissions during Year 2. The intensity of NOX emissions in Year 2 increased relative to Alternative C, because of implementation of the some additional restoration elements that are proposed under Alternative D, including shallow excavation of pasture to marshplain and floodplain elevations. The "substantial" amount of NOX potentially emitted would represent a major or substantial impact and, therefore, a potentially significant impact under CEQA according to BAAQMD CEQA guidelines (1999). This impact would be mitigated would be mitigated to less than significant under CEQA and moderate under NEPA using mitigation measures recommended by BAAQMD described below.

Emissions-Project Implementation: Alternative D would have very similar effects to Alternative C on air quality after project implementation. The minimal amount of public access-related vehicle trips and maintenance-related use of earthmoving equipment would have only negligible effects on carbon monoxide (CO) and Total Emissions of other pollutants.

Odors: In terms of odor, this alternative would have identical effects to Alternative C, with a minor beneficial effect over the long-term and a moderate adverse effect potentially during construction and over the short-term due to excavation and drainage-related disturbances to wetland and heavily manured soils in the Giacomini Ranch and organic matter decomposition and related chemical changes in Olema Marsh.

Conformity: Alternative D would be considered to be in conformity with SIPs for ozone and CO. While there would be minor emissions of CO during both construction seasons, ROG emissions would remain negligible. These emissions would not be expected to be out of conformance with SIP or to cause the Bay Area Air Basin to become out of compliance with the SIPs.

Proposed Mitigation Measures: Construction activities during the second construction year would potentially generate major or substantial amounts of nitrogen dioxide (NOX) from emissions of earthmoving equipment. This would be considered a significant impact under CEQA based on BAAQMD CEQA guidelines (1999). The Park Service and CSLC propose to mitigate this impact to a less-than-significant level under CEQA and a moderate impact under NEPA through instituting the following Best Management Practices advocated by BAAQMD (1999). Specifically, contractors would be required to: 1) minimize idling time to 5 minutes; 2) maintain properly tuned equipment; and 3) limit the hours of operation of heavy duty equipment or the number of pieces of equipment operating simultaneously. In addition, PM10 emissions would be minimized by watering down construction areas and hauling routes, where feasible, and washing tires of hauling trucks before they exit Project Area.

Effectiveness of Proposed Mitigation Measures: Mitigation measures proposed by the Park Service and CSLC are ones recommended specifically by BAAQMD for mitigating impacts of pollutant emission from

earthmoving equipment during construction and would, therefore, be considered to proven, effective mitigation measures.

Cumulative Impacts: Cumulative impacts would similar to those described for Alternative C.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative D on air quality during construction and after implementation would generally be very similar to Alternative C, with the intensity of effects for most air pollutants ranging from negligible to minor, although NOX emissions during Year 2 of construction could increase in intensity to major or substantial. Relative to the construction schedule proposed under the DEIS/EIR, the new construction schedule maintains a similar intensity of impacts, even though estimates for the total amount of earthmoving increased relative to those included in the DEIS/EIR. Changes in total amount of earthmoving resulted from refinement in earthmoving estimates, as well as for designs for the Olema Marsh restoration component. Excavation, fill, and grading actions would result in only negligible amounts of most emissions being generated by earthmoving equipment, although there would be the potential for minor CO emissions during both years of construction, moderate NOX emissions during Year 1 of construction, and major NOX emissions during Year 2. The intensity of NOX emissions in Year 2 increased relative to Alternative C, because of implementation of the some additional restoration elements that are proposed under Alternative D, including shallow excavation of pasture to marshplain and floodplain elevations. The "substantial" emissions of NOX would be considered a significant impact under CEQA. The Park Service and CSLC propose to mitigate this impact to a less-than-significant level through construction-related Best Management Practices (see Proposed Mitigation Measures above) recommended by BAAQMD (1999). With implementation of these BAAQMD-approved mitigation measures, this alternative would be expected to be in conformance with the General Conformity Rule in that it would not exceed emissions thresholds established under SIPs for improvement of ozone and maintenance of CO in the Bay Area Air Basin, even with implementation of other small-scale projects in the vicinity.

In terms of project implementation, the minimal amount of public access-related vehicle trips and maintenance-related use of earthmoving equipment would have only negligible effects on carbon monoxide (CO) and Total Emissions of other pollutants. This alternative would have a long-term minor beneficial effect on odors in the local community with conversion from the dairy to either open space, although there may be some moderate adverse effects during construction and the short-term associated with excavation- and drainage-related disturbance of wetland and heavily manured soils in the Giacomini Ranch and Olema Marsh.

Air Resources - Noise and Soundscapes

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

The Park Service is directed to preserve, to the greatest extent possible, the natural soundscapes of parks and to protect natural soundscapes from degradation due to noise, defined as "undesirable human-caused sound" (NPS 2006, Section 4.9). The Park Service policy is considered a more stringent standard than set by the federal Noise Control Act of 1972, which was established to promote an environment free of the noise that can jeopardize public health or welfare. A number of federal, state, and local agencies have established policies regarding the maximum amplitude or peak pressure of the sound wave, which are measured in decibels. The U.S. Department of Housing and Urban Development (HUD) established 24-hour period thresholds for noise impacts on residential projects, with 65 decibels over 24-hour period (dB-Ldn) or less considered acceptable, 66-75 dB-Ldn normally unacceptable, and 75 db-Ldn or greater as unacceptable. Ldn refers to noise averaged over a 24-hour period or the Day-Night Equivalent Sound Level. The California Department of Health Services (DHS) has published guidelines for use in developing in local general plans, which range from less than 65 dB-Ldn for low-density residential uses and conditionally acceptable levels as less than or equal to 70 dB-Ldn.

In 1994, the Marin County Noise Element mandated that residences, public spaces, and institutions not be subjected to noise levels above an average of 60 decibels (dB) over a 24-hour period or 60 dB-Ldn. Many planning agencies use a 24-hour average of noise intensity, with a 10 dB "penalty" added for nighttime noise

(10:00 p.m. to 7:00 a.m.) to account for the greater intrusiveness of loud noises during this time of the day (California Code of Regulations 1988).

The County has also developed noise criteria under its CEQA guidelines (Marin County Community Development Agency 1994). These criteria generally characterize noise impacts as significant if the project would generate noise that 1) conflicts with countywide or state noise standards; 2) substantially increases noise levels in areas of sensitive receptors; or 3) is not compatible with baseline or ambient noise levels. Sensitive noise receptors include schools, residences, child care centers, health facilities, and convalescent centers. Unlike some counties such as Napa, the County of Marin has not established separate noise criteria for construction: The County of Napa has established 75 dBA[2] as the maximum allowable sound levels during construction. However, in 2005, the County did recently expand the loud and unnecessary noise ordinance to include guidelines on acceptable hours of operation for "loud noise-generating construction-related equipment (e.g., backhoes, generators, jackhammers)" as Monday through Friday, 8 a.m. to 5 p.m., with some exceptions, including construction projects of City, County, State, other public agency, or other public utility (Marin County Board of Supervisors, Ordinance No. 3431).

General Assumptions and Methodologies

- The proposed project has the potential to impact soundscapes and noise through operation of construction equipment and haul trips to local quarries to dispose of excess excavated sediment, as well as vehicles used to transport construction personnel to and from the Project Area. Following completion of construction, noise would be generated primarily through an increase in vehicles of visitors who might come to view the restored wetland or use the public access facilities.
- Noise levels have been studied in a few areas in the vicinity of the Project Area by the County of Marin (State Route 1) and by proponents of other projects (selected areas in Point Reyes Station). Most of these are outside the Seashore and the GGNRA north district. No ambient noise levels are available for the Seashore.
- To estimate ambient noise conditions for several roads in and near the Project Area that have not been surveyed, an approach from HUD's noise assessment guidelines in its *Noise Guidebook* (HUD 2004) was used that estimates average ambient noise levels based on vehicular traffic counts.
    - Noise levels were estimated using average daily traffic data collected in traffic surveys conducted by BRW and Lee Engineering in 1998. These roads included Bear Valley Road, Sir Francis Drake Boulevard, Pierce Point Road, and State Route 1 north of Point Reyes Station.
    - While the BRW and Lee Engineering (1998) study projected that park visitation and vehicle trips would climb 1 percent annually through 2010, park visitation has dropped overall since 1998 and, in 2005, was 27 percent lower than BRW and Lee Engineering projections. Therefore, these numbers could slightly overestimate ambient noise conditions on roads, although they do not take into account ancillary sources (e.g., construction at adjacent houses, etc.) that contribute to ambient noise levels along road corridors.
- For this analysis, the maximum threshold for ambient noise conditions is established as 60 dB–Ldn or 60 dBA over a 24-hour period, which is mandated by county ordinance. There may be noises during the daytime that exceed 60 dBA, which reflects the fact that the Project Area is bordered by several heavily traveled roads, including Sir Francis Drake Boulevard, Levee Road, Bear Valley Road, and State Route 1. However, noise levels are averaged over a 24-hour period, with nighttime noise conditions projected to average 45 dBA, so there can be temporary periods in which noises reach as high as 75 dBA without violating county ordinance.
- Sensitive receptors in the Project Area are represented almost exclusively by residences (Figure 40). The closest residences to the Project Area are three homes along Sir Francis Drake Boulevard in Inverness Park, which are contiguous with and at roughly the same elevation as the West Pasture of the Giacomini Ranch. There are approximately 12 parcels on Levee Road, which are across Lagunitas Creek from the southern portion of the East Pasture of the Giacomini Ranch, are also at roughly the same elevation as the pastures. The nearest sensitive receptors are a childcare center at the Dance Palace and a senior housing project on Mesa Road in Point Reyes Station, approximately 800 to 400 feet, respectively, away from the Project Area.

Described below are methodologies for impact thresholds related to soundscape and noise resources, including specific assumptions or details on methodologies.

[2] dBA=decibels adjusted or decibels as measured on a frequency range similar to the human ear (1 kHz to 4 kHz).

Noise and Soundscapes – Construction-Related: The impact thresholds for construction-related noise are based on thresholds established by the county and CEQA guidelines, which discourages exposure to noise levels that would exceed county ordinances and other federal and state laws and policies, as well as noise that would result in a substantial increase in temporary and periodic noise exceeding ambient noise levels (Table 47). The County of Marin has established 24-hour noise thresholds of 60 dB-Ldn associated with operation of a completed project, but it has not established specific thresholds for construction. It should be noted that the 24-hour noise threshold for agricultural and industrial areas is 70dB-Ldn. The threshold established by Marin CWP of 60dB-Ldn pertains to a 24-hour average noise level, including the assignment of a 10dB penalty for noise occurring at night between 10 p.m. and 7 a.m. The noise associated with construction is different from operational noises, because it is louder, but usually short-term or more intermittent and does not occur in the evening or nighttime hours. While the Counties of Napa and Solano have established thresholds of 75 dBA on construction activities at 50 feet, Marin County does not have a construction noise ordinance.

The existing use of the Project Area is an agricultural operation. Proposed actions will return the area to a more natural condition, but for the purpose of this analysis, the construction activities will be considered consistent with the agricultural 24-hour threshold of 70 dB-Ldn. Noise surveys have shown that maximum levels for temporary and periodic noise often exceed 75 dBA in towns such as Point Reyes Station, reaching as high as 87 dBA (EDAW Inc. 2001). The hours of construction for the proposed project within sensitive receptor zones would be 7am to 6pm during weekdays. Any work exceeding these hours or occurring on the weekends within sensitive receptor zones would be short-term and would require approval by the Park Service, CSLC, and possibly the county. The absence of project-related construction noise during the evening and night hours means that noise during night hours would not exceed low-level ambient or background conditions for town and rural areas (~45 dBA). Therefore, construction-related noise that does not exceed 75 dBA during the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, would meet the 24-hour noise thresholds of 60 dB-Ldn established by the County of Marin.

Impact thresholds for the construction period, then, incorporate a range of potential construction-related changes to ambient noise conditions, with levels exceeding 75dBA considered major under NEPA and substantial and significant under CEQA. CalTrans and the Federal Highway Administration have published criteria relating to the intensity of impacts from changes in ambient noise levels. According to these guidances, increases in ambient noise conditions of 5 dBA is considered "possibly significant," and increases of 6 – 10 dBA in urban areas and ≥ 10 dBA in rural areas -- or exceedances of local noise ordinances -- are considered generally significant under CEQA. Changes in ambient noise of less than 3 dBA are assumed to be negligible due to the fact that human ear can barely detect changes of this magnitude.

Noise produced by construction equipment depends upon a number of variables. These variables include: 1) the type of equipment (e.g., excavator, jackhammer, bulldozer, sheet pile driver, dump truck, etc.), 2) period of operation of equipment, 3) number of pieces of equipment operated simultaneously, 4) distance from the receiver to construction equipment, and 5) effects of topography and other factors (e.g., sound walls, wind direction, thick, dense vegetation) on noise propagation or attenuation. The number of pieces of construction equipment operating simultaneously can vary considerably during the construction period, but it can be assumed that several pieces of equipment might be operating simultaneously. Based on the conceptual design approach, it is anticipated that anywhere from one to four pieces of construction equipment would be operating on specific construction tasks during each construction year or years (2007 or 2007 and 2008) depending on the particular alternative. Construction noise can also include multiple haul trips made by dump trucks or trucks used to either bring construction materials to the Project Area or to transport materials such as excavated sediment to disposal locations, which can increase noise along roadway corridors.

For the purposes of this analysis, the maximum number of potential pieces of construction equipment, including 3 dump trucks, will be assumed to be operating simultaneously to provide a conservative or cautious estimate of impact, although it is unlikely that all equipment would be operating simultaneously. The number of necessary construction personnel will also be estimated, with a person-to-vehicle ratio of 1.3 assumed. Changes in noise levels generated by dump trucks and construction personnel vehicles along roadway corridors were estimated using HUD noise assessment guidelines (HUD 2004) that estimate average 24-hour noise conditions from average daily traffic volume. Under most alternatives, construction activities would be concentrated to some degree in focal areas (Figure 40). Noise generated by maximum number of simultaneously operating construction equipment in these construction focus areas will be evaluated relative to the distance to the nearest sensitive receptors, which are almost exclusively private residences. Scaling factors used to adjust noise emissions from equipment will be attenuation of noise with distance, with noise produced by construction equipment expected to decrease about 6 dB for every doubling of distance. In

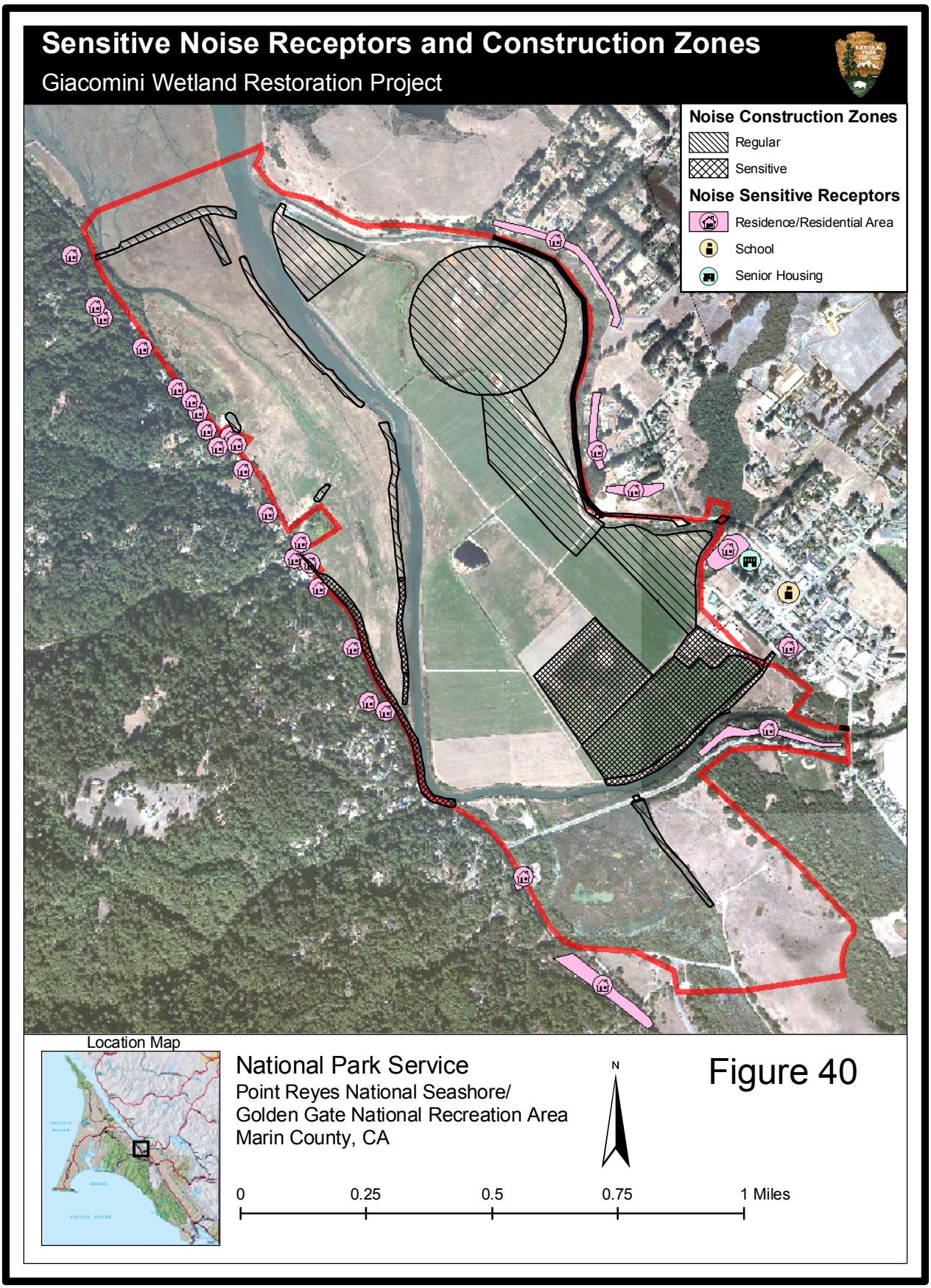

Sensitive Noise Receptors and Construction Zones
Giacomini Wetland Restoration Project
Noise Construction Zones
Regular
Sensitive
Noise Sensitive Receptors
Residence/Residential Area
School
Senior Housing
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 40

addition, noise barriers, which can include embankments, walls, and thick, dense vegetation at least 100 feet in width (Federal Highway Administration 2001) also attenuate sound.

TABLE 47. NOISE AND SOUNDSCAPES – CONSTRUCTION-RELATED EFFECTS

Source: Park Service Management Policies, HUD, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Construction	
No Impact	There would be no potential for impact to noise and soundscape resources associated with construction of the proposed project.
Negligible	The proposed project would generate construction-related noise that would be barely detectable (change of ≤ 3 dBA) by sensitive receptors from existing conditions (adjacent residences) and within the range of ambient or background noise conditions.
Minor	The proposed project would generate construction-related noise that would have a minor effect on ambient noise levels (change of ≤ 5 dBA) and would be detectable by sensitive receptors beyond existing conditions (adjacent residences). Maximum noise levels during construction would not exceed 75 dBA as perceived by the nearest sensitive receptor.
Moderate	The proposed project would generate construction-related noise that would have a moderate effect on ambient noise levels (change of ≤ 10 dBA) and be apparent and appreciable to sensitive receptors beyond existing conditions (adjacent residences). Maximum noise levels during construction may exceed 75 dBA as perceived by the nearest sensitive receptor for short periods of time, without construction noise mitigation measures.
Major or Substantial	The proposed project would generate construction-related noise that would have a substantial effect on ambient noise levels (change of > 9 dBA) and highly apparent to sensitive receptors beyond existing conditions (adjacent residences). Maximum noise generated during construction would potentially exceed 75 dBA as perceived by the nearest sensitive receptor.

Noise and Soundscapes – Project-Related: Impacts to noise and soundscapes from implementation or operation of the proposed project would result primarily from the potential increase in the number of visitors, residents, and vehicles coming to view the restored wetland or use the public access facilities. Estimates of the change in visitors and vehicles within the Project Area are based on projected increases in overall park visitation in the future, as well as on evaluation of the number of public access-related structures, facilities, and attractions/uses provided by each of the various alternatives. These semi-quantitative ranking systems are discussed in greater detail under Chapter 3.

To qualitatively or semi-quantitatively estimate noise generated by visitors, residents, and vehicles, the estimated maximum number/range of visitors and residents and associated vehicles that would visit or use each of the facilities in the Project Area was used as the basis for analysis. It would be expected that the highest visitation would occur on weekends, when visitation to the local community and parks are naturally highest. The evaluation also assumed that peak visitation would occur simultaneously on weekends for all of the public access facilities proposed under the various alternatives. Approximately 70 percent of the visitors were assumed to be driving alone, while the other 30 percent were assumed to be paired in vehicles. In addition to vehicle noise, visitors would generate additional noise through conversation: people talking normally generate noise levels in the range of approximately 50 to 70 dB, with normal conversation in the range of 60 – 65 dB. However, for the purposes of this analysis, the relative contribution of conversation to changes in ambient noise levels was considered negligible. This approach was considered to provide a conservative or cautious estimate of impacts such that it would err on the side of over-estimating the total number of people and vehicles that might be present at any one time.

The impact thresholds for project-related noise were based on thresholds established by the county and CEQA guidelines, which discourage exposure to noise levels that would exceed county ordinances and other federal and state laws and policies, as well as noise that would ***substantially*** and permanently increase ambient noise levels above existing levels (Table 48). CalTrans and the Federal Highway Administration have published criteria relating to the intensity of impacts from changes in ambient noise levels. According to these guidances, increases in ambient noise conditions of 5 dBA is considered "possibly significant," and increases of 6 – 10 dBA in urban areas and ≥ 10 dBA in rural areas -- or exceedances of local noise ordinances -- are considered generally significant under CEQA. In addition, changes in ambient noise conditions that would increase noise levels above 60 dB-Ldn, the threshold established by the County, would be considered major under NEPA and substantial and significant under CEQA. Based on a night-time average ambient noise condition of 45 dBA, which is reasonable for a rural area, daytime averages would need to exceed 75 dBA to

exceed the 60 dB-Ldn thresholds established by the county noise ordinance. Because the proposed project will both potentially increase and decrease the number of noise sources (e.g., agricultural operations), impact thresholds incorporate the potential for both increases and decreases in ambient noise conditions (assumed to be 60 dB-Ldn) for areas adjacent to the Project Area), with changes in ambient noise of < 3 dBA assumed to be negligible due to the fact that human ear can barely detect changes of this magnitude.

TABLE 48. NOISE AND SOUNDSCAPES – PROJECT-RELATED EFFECTS

Source: Park Service Management Policies, HUD, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Long-Term	
No Impact	There would be no potential for impact to noise and soundscape resources associated with implementation of the proposed project.
Negligible	The proposed project would generate an undetectable or barely detectable change (generally ≤ 3 dBA) in ambient noise conditions in the local community. Changes in ambient noise conditions would not exceed the 60 dB-Ldn 24-hour average noise level threshold established by county ordinance.
Minor	The proposed project would generate a small, but detectable change (generally ≤ 5 dBA) in ambient noise conditions in the local community. Changes in ambient noise conditions would not exceed the 60 dB-Ldn 24-hour average noise level threshold established by county ordinance.
Moderate	The proposed project would generate an apparent or appreciable change (≤ 10 dBA) in ambient noise conditions in the local community. However, changes in ambient noise conditions would not exceed the 60 dB-Ldn 24-hour average noise level threshold established by county ordinance.
Major or Substantial	The proposed project would generate a major or substantial change (> 10 dBA) in ambient noise conditions in the local community; **OR** Would exceed County of Marin noise ordinance of 60 dB-Ldn or 60 dBA over a 24-hour period.

Impact Analysis

TABLE 49. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR AIR RESOURCES – SOUNDSCAPES

All impacts would be considered Adverse (unless otherwise noted) and Local Community and are separately analyzed for Construction and Short-Term/Long-Term. ***Slashed entries refer to the range in intensity of impacts for specific components under impact indicators: bold-faced entries refer to the average impact intensity.***

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Noise and Soundscapes – Construction-Related Effects	Negligible/ Minor	Negligible/ Major or Substantial*	Negligible/ Major or Substantial*	Negligible/ Major or Substantial*	Negligible/ Major or Substantial*
NEPA: Intensity Following Mitigation		Moderate	Moderate	Moderate	Moderate
CEQA: Significance Following Mitigation		Less than Significant	Less than Significant	Less than Significant	Less than Significant
Noise and Soundscapes – Project-Related Effects	Beneficial - Minor	Adverse-Minor	Adverse-Minor	Adverse-Negligible	Beneficial-Negligible

* Conclusion limited to Specific Sensitive Receptor Areas near Levee Road, C Street, and/or Sir Francis Drake Boulevard in Inverness Park.

No Action Alternative

Analysis: The effects of the No Action Alternative on ambient noise in the local community during construction and after implementation would generally range from negligible to minor (Table 49). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. (The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the

Park Service receiving monies to purchase and restore the Giacomini Ranch.) The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh and the West Pasture are not restored, and there would be no construction of new public access facilities.

Construction: The wetland restoration/mitigation component would be located more than 2,000 feet from any sensitive noise receptors. The largest source of noise associated with construction would come from an increase in truck traffic along primary roadway corridors associated with hauling of excavated sediments to local quarries. Approximately 200 truck trips would be required to dispose of approximately 3,800 cubic yards of sediment. For this analysis, three trucks were assumed to be running simultaneously for a short, concentrated period of time, with the total number of daily truck trips not exceeding exceed 25 roundtrips or 50 single trips. This analysis also took into account vehicular traffic associated with commuting of construction personnel to the Project Area.

Because the wetland restoration is located in the northwestern corner of the East Pasture, trucks hauling sediment would be traveling through Point Reyes Station and then would likely use Sir Francis Drake Boulevard to the primary quarry disposal locations in the Seashore located near Pierce Point Road (Figure 7). In rural areas, ambient noise levels typically range from 40 to 50 dBA. In urban areas or in rural areas adjacent to roads and highways such as Point Reyes Station, noise levels typically range from 60 to 70 dBA. Ambient noise levels on State Route 1 south of Point Reyes Station averaged 65 decibels in 2001 (County of Marin 2004). In the town of Point Reyes Station, average ambient noise levels were slightly higher (69 dB), with maximum and minimum levels of 87 and 43 dB, respectively (EDAW Inc. 2001). Traffic on local roads and State Route 1 constitutes the dominant noise source (EDAW Inc. 2001). Based on an approach that estimates average ambient noise levels from traffic survey data, noise levels for non-surveyed roads could average 70.8 dBA for State Route 1 north of Point Reyes Station; 69.5 dBA for Bear Valley Road and Sir Francis Drake Boulevard; and 66.5 dBA for Pierce Point Road.

As these numbers would suggest, most of the local and regional roadways such as Sir Francis Drake Boulevard are already somewhat noisy because of the relatively high volume of car and truck traffic associated with residents, park visitors and staff, and dairy and ranching-associated businesses. Agricultural operations in the Olema Valley and Point Reyes Peninsula generate a considerable number of truck trips within the local community, including twice daily runs of milk trucks and periodic runs of hay trucks and other suppliers. Increased truck traffic along these already busy local and regional roadways would cause only a negligible increase (≤ 3 dBA) in noise levels in Point Reyes Station and along Sir Francis Drake Boulevard. However, the lower volume of traffic on Pierce Point Road, combined with its steeper gradient, may increase the relative effect of these truck trips on noise conditions, causing a minor change in ambient noise levels in this area with the increase estimated at approximately 4 dBA.

Project Implementation: After construction is completed, noise levels would not be expected to increase relative to baseline conditions, because there would be no new public access structures or facilities. This alternative would potentially have a beneficial minor effect on soundscapes in that it would generate a small, but detectable decrease in noise associated with intensive agricultural operations such as dairies. Dairies often produce loud or sharp temporary noises from operation of milk trucks, backhoes, All-Terrain Vehicles (ATV), and other mechanized farm equipment that have peak noise levels ranging from 100 to 122 dBA at 0-5 feet (Depczynski et al. 2002). While the dairy will close in spring 2007 due to the expiration of the existing Reservation of Use Agreement with the Giacomini Trust, there is a potential for leased grazing of dairy heifers or beef cattle under the No Action Alternative through separate environmental review process. Even if leased grazing is approved, noise intensity would still be expected to be lower than those of the dairy operations and would be limited largely to the periodic or infrequent use of livestock trucks to trailer animals on and off the Giacomini Ranch. In addition, there may be occasional noise generated by earthmoving equipment performing maintenance on the property. Overall, the No Action Alternative would be expected to result in a minor beneficial effect in noise conditions for the local community after implementation, particularly for residents along 3rd and C Streets and possibly for downtown Point Reyes Station.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There are only three currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented.

These would be the proposed land exchange between the Park Service and the Giacomini family, Sir Francis Drake Boulevard Repaving Project, and the Culvert Cleaning near Olema Marsh, all of which are proposed for implementation in fall 2007. As part of the proposed land exchange, buildings would be removed from the Dairy facility: these removal efforts would generate noise. However, it is likely that the proposed building removal would be conducted prior to implementation of restoration. The County has tentatively planned to schedule the road repaving project after hauling for the proposed project would be completed (M. Madayag, County of Marin Department of Public Works, *pers. comm*.), so it is likely that construction schedules would be staggered to some degree and not directly overlap. Should the culvert cleaning move forward in fall 2007, it is unlikely that the scale of the proposed cleaning efforts would raise cumulative ambient noise levels along and in the vicinity of Levee Road above the negligible level.

Once the Giacomini Dairy closes, lands along C Street would be available for other uses. These parcels are primarily zoned Coastal Residential (CRAB-2) and could potentially at some point be developed into as many as 8-10 homes (including parcels already owned by the Giacomini family). For the local community as a whole, residential development would constitute a negligible to minor adverse impact, although the impacts to nearby residents could possibly be constructed as appreciable or moderate. As with the proposed project, the analysis of impacts from this potential project would need to take into account existing or baseline ambient noise generated along C Street by operation of the dairy, including twice-daily milk truck runs, hay trucks, and use of earthmoving equipment for maintenance and ATVs. Because the No Action would be expected to have minor beneficial, effects on ambient noise following implementation, cumulative impacts would be considered adverse negligible at most. Most of the other medium- to large projects that might be constructed during the same timeframe are distant enough that there would be no cumulative effects on ambient noise, except for the Bear Valley Creek Watershed and Fishery Enhancement Project. However, there is no definitive timeframe for construction of this project.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of the No Action Alternative on ambient noise in the local community would generally range from adverse negligible/minor to beneficial minor. The only construction would be a small restoration component that is required under the Park Service's existing mitigation agreement with CalTrans, which would have negligible effects on sensitive receptors except for along Pierce Point Road. Hauling of excavated sediments to quarries in the Pierce Point Road vicinity would generate a minor increase in ambient noise levels during construction. This alternative would actually have a minor beneficial effect on ambient noise conditions after implementation, because loud and sharp noises associated with intensive agriculture such as dairying would be discontinued when the dairy closes in spring 2007 in accordance with the expiration of the Park Service's existing Reservation of Use Agreement with the Giacomini Trust. Potential future maintenance and agricultural uses such as leased grazing would be expected to produce only very infrequent or periodic loud noises from use of earthmoving equipment and trucks to trailer animals on and off the Giacomini Ranch.

Alternative A

Analysis: The effects of Alternative A on ambient noise in the local community during construction and after implementation would range from negligible to major (Table 49). Under this alternative, the East Pasture of the Giacomini Ranch would be restored, with new public access structures and facilities largely located on the eastern and southern perimeters of the East Pasture. The West Pasture and Olema Marsh would not be restored, although there is a potential for a future extension of the southern perimeter trail to Inverness Park either through widening of the Sir Francis Drake Boulevard berm or a boardwalk that would run through the West Pasture.

<u>*Construction*</u>: Most of the effects of construction on sensitive noise receptors or residences in the vicinity of the East Pasture would be attenuated either through distance or natural barriers such as road embankments, elevation differences, or thick, dense vegetation. There are at least two areas identified as a sensitive construction zones (southeastern portion of East Pasture and Sir Francis Drake Boulevard corridor) where sounds would not naturally be attenuated to the degree needed to keep noise levels below 75 dBA during daytime hours (Figure 40). Under this alternative, most of the construction in the southern portion of the East Pasture occurs in the western quadrant near White House Pool: creek banks would be regraded to a more

stabile profile, and a prefabricated bridge would be installed. These areas appear distant enough from residences that noise levels would not increase substantially.

However, grading and finishing of the southern perimeter trail across from the homes on Levee Road and homes on 3rd and C Streets would potentially elevate noise to 84 to 86 dBA for very short periods of time. Homes on Levee Road are approximately 130 to 150 feet from the East Pasture levee, and those at the corner of 3rd and C Street are approximately 80 feet away. The latter would be more affected by trail construction activities. Grading would be required to construct the trail, but this activity would occur only for a very short period, and other trail-related construction activities (e.g., fence installation, installation of trail tread) in this zone would otherwise appear to generate minimal noise. The other sensitive construction zone would occur along the Sir Francis Drake Boulevard corridor and would be associated with the potential future extension of the southern perimeter trail to Inverness Park. While this trail would be designed and constructed through a separate environmental review process jointly conducted with the county, it would possibly involve either widening of the Sir Francis Drake Boulevard road berm through placement of fill or construction of a boardwalk in the West Pasture. Both of these approaches would possibly generate construction-related noise that would exceed 75 dBA.

Because earthmoving and other construction activities would generate noise at levels that may exceed 75 dBA for nearby sensitive receptors, impacts under this alternative would be characterized as be major under NEPA and substantial and significant under CEQA. These impacts would be localized and very short term and would be mitigated to less than significant under CEQA and moderate under NEPA using Best Management Practices identified below.

Other than earthmoving, the largest source of noise associated with construction would come from an increase in noise along local and regional roadway corridors associated with hauling of excavated sediments to local quarries. Under this alternative, approximately 52,550 cubic yards of excess sediment excavated would be hauled to quarries within the Seashore for disposal, which would result in an increase in the number of potential single truck trips from approximately 200 under the No Action Alternative to 2,600 under Alternative A. This analysis assumed that two (2) to four (4) 20 cubic-yard trucks would be running simultaneously for a longer period of time relative to the No Action Alternative, with the maximum total number of daily truck trips not exceeding exceed 32 roundtrips or 64 single trips. (E. Polson, Polson Civil Engineering, *pers. comm*.). As with the No Action Alternative, it also took into account vehicle-related noise associated with commuting of construction personnel to the Project Area.

Because this alternative focuses on the East Pasture, trucks hauling sediment would be traveling through Point Reyes Station from either the Mesa Road or C Street access points and then would likely use Sir Francis Drake Boulevard to reach the primary disposal locations in the Seashore located near Pierce Point Road (Figure 7). Most of the local and regional roadways such as Sir Francis Drake Boulevard are already somewhat noisy because of the relatively high volume of car and truck traffic associated with residents, park visitors and staff, and dairy and ranching-associated businesses. Agricultural operations in the Olema Valley and Point Reyes Peninsula generate a considerable number of truck trips within the local community, including twice daily runs of milk trucks and periodic runs of hay trucks and other suppliers.

Increased truck traffic would cause only a negligible increase (≤ 3 dBA) in noise levels in Point Reyes Station and along Sir Francis Drake Boulevard. The intensity of impact would be minimized to some degree by the extended timeframe over which construction would occur: restoration would occur over two construction seasons, with construction of public access expected to occur over two construction seasons following implementation of restoration. However, the lower volume of traffic on Pierce Point Road, combined with its steeper gradient, may increase the effect of hauling relative to Sir Francis Drake Boulevard. In this area, truck trips would cause a minor short-term, localized change in ambient noise levels estimated at approximately 4 dBA. Taking into account the length of travel on each of the roads, truck hauling during construction would be expected to result in no more than an overall adverse negligible effect on ambient noise conditions along local and regional roadways.

Project Implementation: After implementation, effects on soundscape resources or ambient noise conditions would result primarily from changes in visitation and the number of vehicles traveling to and from the Project Area, because of the expansion in public access-related structures, facilities, and attractions/uses. In addition, there may be occasional noise generated by earthmoving equipment performing maintenance on the property. As discussed under the No Action Alternative, this alternative would potentially have a beneficial effect on soundscapes in that it would generate a small, but detectable decrease in noise associated with

intensive agricultural operations such as dairies. Dairies often produce loud or sharp temporary noises from operation of milk trucks, backhoes, All-Terrain Vehicles (ATV), and other mechanized farm equipment that have peak noise levels ranging from 100 to 122 dBA at 0-5 feet (Depczynski et al. 2002).

In general, the potential increase in noise associated with visitation and use of public access facilities in the Project Area would not be expected to result in more than a negligible to minor adverse effect on ambient noise conditions. The largest potential for a change in ambient noise conditions would occur for sensitive receptors on Levee Road, near 3rd and C Street, and directly north of the worker housing along Tomasini Creek on the west side of Mesa Road in Point Reyes Station. The southern perimeter trail that would be constructed in the vicinity of these sensitive receptors would be used by a higher number of visitors than the informal path that currently exists, thereby increasing the number of vehicles relative to baseline conditions. The higher number of visitors relative to baseline conditions would increase noise levels both from vehicles and from people conversing with each other. In addition to noise from traveling vehicles, residences near 3rd and C Streets in Point Reyes Station would be affected by sounds associated with engine starting and acceleration and deceleration of vehicles traveling to and from new or expanded public access structures and facilities, because they would be located in the vicinity of designated trailheads. Noise from engine starting and vehicle acceleration and deceleration are louder than those generated by a traveling vehicle.

Other sensitive receptors that could possibly be affected by construction or enhancement of public access facilities are residences on the Point Reyes Mesa above the eastern perimeter trail and homes along Sir Francis Drake Boulevard adjacent to the possible future extension of the southern perimeter trail to Inverness Park. Currently, there is no public access along the eastern perimeter of the East Pasture except at the terminus of the Tomales Bay Trail. Therefore, construction of the eastern perimeter trail, which would connect to the Tomales Bay Trail, would introduce a new source of noise for residences along the Point Reyes Mesa, however, visitation-related increases in ambient noise levels would be expected to represent no more than a minor adverse impact in this area. Noise generated near homes along Sir Francis Drake Boulevard by the possible future extension of the southern perimeter trail to Inverness Park would be largely masked by the roadway noise and would have no more than a negligible adverse effect on ambient noise relative to baseline conditions.

The intensity of these impacts must be balanced with the fact that these areas are currently subject to higher ambient levels of noise due to operation of the dairy, worker housing, and the existing informal path on the East Pasture levee. Noise associated with the dairy facility on C Street includes twice daily milk truck stops; hay truck and other truck deliveries; operation of backhoes, dump trucks, and other construction equipment; and vehicle and conversation noise of ranch workers. In addition, a certain amount of noise is already generated in this area by people using the informal path that currently exists on the levee, who usually park near 3rd and C Streets. On Mesa Road, noise is generated by ranch workers living in housing on the north side of Tomasini Creek, as well as by earthmoving equipment used by the Giacominis for ranch maintenance activities in the East Pasture.

Under Alternative A, noises associated with dairy operations would be eliminated, while noise associated with visitation and use of public access facilities would either be considered an increase relative to public access-related noise generated under baseline conditions (southern perimeter trail) or a new source of noise (eastern perimeter trail). Because public access-related noise would increase relative to baseline conditions and would be more constant than the agricultural-related noise eliminated by close of the dairy, this alternative may have an overall minor adverse effect on ambient noise conditions that would not violate the county noise ordinance of 60 dB-Ldn.

Proposed Mitigation Measures: To reduce noise levels to the maximum extent practicable in sensitive construction zones, the construction contractor shall employ the following noise-reducing Best Management Practices (BMP). Construction would be limited to the hours of 8 a.m. and 6 p.m. Monday through Saturday in sensitive construction zones, with weekends permissible only under special authorization from the Park Service and CSLC. All equipment would have sound control devices that are no less effective than those provided by the original equipment and would have muffled exhaust. In addition, contractor would be required to maintain properly tuned equipment and limit idling time to 5 minutes, limit the number of concurrently operating pieces of construction equipment within the Sensitive Noise Receptor Area, notify adjacent residences in advance of construction, and potentially reschedule construction activities.

Effectiveness of Proposed Mitigation Measures: Implementation of the proposed mitigation measures

would reduce the intensity of impacts in sensitive construction zones to less-than-significant levels under CEQA.

Cumulative Impacts: There are only three currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts should Alternative A be implemented. These would be the proposed land exchange between the Park Service and the Giacomini family, Sir Francis Drake Boulevard Repaving Project, and the Culvert Cleaning near Olema Marsh, all of which are proposed for implementation in fall 2007. Cumulative impacts would be expected to be similar to those discussed under the No Action Alternative, particularly as barn removal proposed as part of the land exchange between the Park Service and the Giacominis would be expected to occur prior to restoration activities.

Once the Giacomini Dairy closes, lands along C Street would be available for other uses. These parcels are primarily zoned Coastal Residential (CRAB-2) and could potentially at some point be developed into as many as 8- 10 homes (including parcels already owned by the Giacomini family). For the local community as a whole, residential development would probably constitute a negligible to minor adverse impact, although the impacts to nearby residents could be considered moderate. As with the proposed project, the analysis of impacts from this potential project would need to take into account existing or baseline ambient noise generated along C Street by operation of the dairy, including twice-daily milk truck runs, hay trucks, and use of earthmoving equipment for maintenance and ATVS. Because Alternative A would be expected to have minor adverse effects on ambient noise after implementation, project-related cumulative impacts would be considered adverse minor to moderate at most.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative A on ambient noise in the local community during construction and after implementation would generally range from negligible adverse to major or substantial adverse, with substantial adverse effects mitigated to less-than-significant levels under CEQA and moderate levels under NEPA. Under Alternative A, restoration and construction of new public access structures and facilities would occur primarily in the East Pasture, although there is a potential to extend the southern perimeter trail to Inverness Park. In general, construction would have only negligible to minor effects on noise along local and regional roadways associated with hauling of excavated sediments and negligible effects on most of the sensitive receptors or residences near the Project Area because of attenuation of noise with distance and natural sound barriers. However, the close proximity of homes on Levee Road, 3rd and C Streets in Point Reyes Station, and Sir Francis Drake Boulevard to two major construction areas would potentially result in temporary, short-term noise levels exceeding 75 dBA. This would be considered a substantial and significant impact under CEQA. While these impacts cannot be eliminated, they have been reduced to a less-than-significant level under CEQA and moderate levels under NEPA through adoption of noise-reducing construction management practices.

The primary effects of this alternative on ambient noise conditions following project implementation may be associated largely with increases in visitation and traffic due to construction or expansion of public access structures, facilities, and attractions/uses. Projected increases in vehicle volume associated with higher numbers of visitors would have a barely detectable or very negligible impact on state, regional, and local roadways. However, impacts may be higher in certain areas such as 3rd and C Streets and directly north of the worker housing near Mesa Road in Point Reyes Station, where trailheads would be located due to noise from engine starting and vehicle acceleration and deceleration. In addition, potential construction of homes along C Street could also contribute cumulatively to an increase in ambient noise levels, although these impacts would not be expected to exceed minor to moderate at most. Construction of the eastern perimeter trail would also introduce a new source of noise for residents on the Point Reyes Mesa. Ultimately, the increase in public access-related noise associated with expansion or construction of public access facilities would be offset to some degree by the elimination of noises associated with operation of the dairy, although visitation and use of public access facilities would be expected to generate a more constant level of noise than the intermittent or periodic loud and sharp noises produced by milk trucks, hay trucks, and earthmoving equipment used for maintenance. Therefore, overall, project implementation would be expected to potentially have a minor adverse effect on ambient noise conditions for at least certain areas within the local community, although ambient noise conditions would not exceed the county noise ordinance of 60 dB-Ldn.

Alternative B

Analysis: The effects of Alternative B on ambient noise in the local community would be very similar to Alternative A, generally ranging from negligible adverse to major or substantial (Table 49). Under this alternative, the East and West Pastures of the Giacomini Ranch would be restored, with most of the new public access structures and facilities still largely located on the eastern and southern perimeters of the East Pasture as they would be in Alternative A. The amount of construction in the sensitive construction zones in the southeastern portion of the East Pasture would be increased, and two other zones would be added in the West Pasture, where levees would be breached or berms or levees would potentially be constructed. Construction in these areas would have the potential to generate noise localized, short-term noise levels exceeding 75 dBA, which would constitute a major impact under NEPA and a substantial and significant impact under CEQA. These effects would be mitigated to a less-than-significant level under CEQA and a moderate level under NEPA using the mitigation measure BMPs described under Alternative A.

Construction: Under this alternative, approximately 72,567cubic yards of excess sediment excavated would be hauled to quarries within the Seashore for disposal (Figure 7). There are at least two areas identified as sensitive construction zones (southeastern portion of East Pasture; Sir Francis Drake Boulevard corridor; southern portion of West Pasture) where construction sounds would not naturally be attenuated to the degree needed to keep noise levels below 75 dBA (Figure 40). Because of this, the number of potential truck trips would climb from approximately 200 under the No Action Alternative and 2,000 under Alternative A to 3,625 under Alternative B. Despite this, impacts to noise levels along local and regional roadways would still be estimated to be negligible, because of the moderate to high existing ambient noise conditions along these busy road corridors and the extended timeframe over which hauling would occur. This alternative would be constructed over three (3) to four (4) construction seasons, with the public access component anticipated to take two years for construction after restoration is completed. The only noticeable increase in estimated noise from hauling occurred along Pierce Point Road, where the lower overall traffic volume on this road, combined with the steeper road gradient, would cause a minor short-term, localized change in ambient noise levels estimated at approximately 4 dBA. Taking into account the length of travel on each of the roads, truck hauling during construction would be expected to result in no more than an overall adverse negligible effect on ambient noise conditions along local and regional roadways.

Project Implementation: After implementation, effects on soundscape resources or ambient noise conditions would result largely from changes in visitation and the number of vehicles traveling to and from the Project Area, because of the expansion in public access structures, facilities, and attractions/uses. In general, the effects of Alternative B on ambient noise after implementation would be almost identical to those of Alternative A, because the public access components are very similar with a few exceptions. The magnitude of a potential increase in visitation and visitor-related traffic would be expected to result in no more than a negligible to minor adverse effect on ambient noise conditions.

The intensity of these impacts must be balanced with the fact that these areas are currently subject to higher ambient levels of noise due to operation of the dairy, worker housing, and the existing informal path on the East Pasture levee. Under both Alternatives A and B, noises associated with dairy operations would be eliminated, while noise associated with visitation and use of public access facilities would either be considered an increase relative to public access-related noise generated under baseline conditions (southern perimeter trail) or a new source of noise (eastern perimeter trail). Because public access-related noise would increase relative to baseline conditions and would be more constant than the agricultural-related noise eliminated by close of the dairy, this alternative would have an overall minor adverse effect on ambient noise conditions that would not violate the county noise ordinance of 60 dB-Ldn.

Proposed Mitigation Measures: Proposed measures to reduce noise levels to the maximum extent practicable in sensitive construction zones would be the same as under Alternative A.

Effectiveness of Proposed Mitigation Measures: Implementation of the proposed mitigation measures would reduce the intensity of impacts in sensitive construction zones to less-than-significant levels under CEQA and moderate levels under NEPA.

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative A.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Despite increases in the extent and degree of restoration, Alternative B would have very similar project-related and cumulative effects as Alternative A on ambient noise in the local community that would range from negligible adverse to major or substantial, with substantial construction-related effect on sensitive receptors reduced to less-than-significant levels under CEQA and to a moderate level under NEPA through incorporation of noise-reducing construction management practices. Following implementation, this alternative would have an almost identical minor adverse effect to Alternative A on ambient noise conditions in the local community that would not violate the county noise ordinance of 60 dB-Ldn. While noise associated with the dairy would be eliminated with its closure, noise associated with increased visitation to new or expanded public access facilities would increase slightly relative to baseline conditions and would be more constant than noise generated by milk trucks, hay trucks, earthmoving equipment used for dairy maintenance, and other agricultural activities. In addition, potential construction of homes along C Street could also contribute cumulatively to an increase in ambient noise levels, although these impacts would not be expected to exceed minor to moderate at most.

Alternative C

Analysis: Alternative C would have very similar effects on ambient noise in the local community during construction and after implementation as Alternative B, with the intensity of effects ranging from negligible adverse to major or substantial adverse (Table 49). Under this alternative, the scope of restoration is expanded to include Olema Marsh and the adjacent Olema Creek watershed, as well as the East and West Pastures of the Giacomini Ranch. The degree of active restoration within the East Pasture and West Pasture is increased, as well. The extent of public access along the eastern perimeter of the East Pasture would be scaled back to include two spur trails or spur trail extensions, with the Mesa Road spur trail becoming an ADA-compliant trail.

Construction: As with the other alternatives, most of the effects of construction on sensitive noise receptors or residences in the vicinity of the East and West Pastures would be attenuated either through distance or natural barriers such as road embankments, elevation differences, or thick, dense vegetation. Similar to Alternative B, there are at least three areas identified as sensitive construction zones (southeastern portion of East Pasture; Sir Francis Drake Boulevard corridor; southern portion of West Pasture) where construction sounds would not naturally be attenuated to the degree needed to keep noise levels below 75 dBA (Figure 40). However, under this alternative, the intensity of restoration in at least two of these sensitive construction areas would increase with the addition of shallow grading or scraping of a 40-acre pasture to eliminate weeds in addition to levee removal, creek bank regrading, and trail construction in the East Pasture and complete removal of the levee in the West Pasture (Figure 40). Also, there would still be the potential for future expansion of the southern perimeter trail to Inverness Park and construction of levees around lower-elevation private properties on the east side of Sir Francis Drake Boulevard (Sir Francis Drake Boulevard corridor; Figure 40). Because earthmoving and other construction activities may generate noise at levels that would potentially exceed 75 dBA for nearby sensitive receptors in these areas, impacts under this alternative would be characterized as be major under NEPA and substantial and significant under CEQA. These impacts would still be localized and very short term, although the duration of impacts would be slightly longer than under Alternative B. These effects would be mitigated to a less-than-significant level under CEQA and a moderate level under NEPA using the mitigation measure BMPs described under Alternative A.

Other than earthmoving, the largest source of noise associated with construction would come from an increase in noise along local and regional roadway corridors associated with hauling of excavated sediments to local quarries. Under this alternative, approximately 125,250 cubic yards of excess sediment excavated would be hauled to quarries within the Seashore for disposal, which would result in an increase in the number of potential truck trips from approximately 200 under the No Action Alternative and 3,600 under Alternative B to approximately 6,275 under Alternative C. This analysis assumed that two (2) to four (4) 20 cubic-yard trucks would be running simultaneously for a longer period of time relative to Alternative B (E. Polson, Polson Civil Engineering, *pers. comm*.), with the total number of daily truck trips not exceeding exceed 32 roundtrips or 64 single trips. As with the other alternatives, it also took into account vehicle-related noise associated with commuting of construction personnel to the Project Area. Under this alternative, trucks hauling sediment from the East Pasture would be traveling through Point Reyes Station from either the Mesa Road or C Street

access points and then would likely use Sir Francis Drake Boulevard to reach the primary disposal locations in the Seashore located near Pierce Point Road (Figure 7). Trucks hauling sediment from Olema Marsh and the West Pasture would primarily be using Sir Francis Drake Boulevard and, for Olema Marsh, either Bear Valley or Levee Roads.

Despite the increase in trips relative to Alternative B, truck traffic would still be expected to cause only a negligible increase (≤ 3 dBA) in noise levels in Point Reyes Station and along Sir Francis Drake Boulevard. Impacts would be slightly higher on Pierce Point Road, because the lower volume of traffic, combined with its steeper gradient, would magnify the effects of hauling on noise conditions relative to Sir Francis Drake Boulevard. In this area, truck trips would cause a minor short-term, localized change in ambient noise levels estimated at approximately 4 dBA. Taking into account the length of travel on each of the roads, truck hauling during construction would be expected to result in no more than an overall adverse negligible effect on ambient noise conditions along local and regional roadways. As discussed under the previous alternatives, the intensity of impact would be minimized to some degree by the high levels of ambient noise that currently exist along these busy road corridors and the extended timeframe over which construction would occur. Construction would occur over an estimated five to seven construction seasons, because it includes construction of public access facilities and restoration of Olema Marsh, which would be restored under an adaptive approach that would phase restoration over time.

Project Implementation: After implementation, effects on ambient noise would result primarily from changes in visitation and the number of vehicles traveling to and from the Project Area, because of the expansion in public access-related structures, facilities, and attractions/uses. In addition, there may be occasional noise generated by earthmoving equipment performing maintenance on the property. Relative to Alternative B, the potential increase in noise associated with visitation and use of public access facilities in the Project Area would be lower, because of changes to or scaling back of the southern and eastern perimeter trails. Therefore, this alternative would still be expected to have barely detectable or very negligible impacts on ambient noise conditions along local and regional road corridors.

The largest potential for a change in ambient noise conditions would occur for sensitive receptors on Levee Road and near 3rd and C Street and in the Point Reyes Mesa area in Point Reyes Station. Under Alternative C, Mesa Road becomes an ADA-compliant spur trail that leads to a viewing near the Giacomini Hunt Lodge on the edge of Tomasini Creek. Access from Point Reyes Station to the southern perimeter trail changes to the Green Bridge, with access point at the corner of 3rd and C Street eliminated. This change in trailhead location decreases potential effects to sensitive receptors near 3rd and C Streets from noise associated with engine starting and vehicle acceleration and deceleration, although noise from users of the adjacent trail system might still be detectable relative to existing conditions. (Noise from engine starting and vehicle acceleration and deceleration are louder than those generated by a traveling vehicle.)

Residences in the Point Reyes Mesa area – particularly those directly north of Tomasini Creek near Mesa Road – would potentially become more affected by sounds associated with engine starting and acceleration and deceleration of vehicles traveling to and from new or expanded public access structures and facilities, because the Mesa Road spur trail would be converted to an ADA-compliant facility. However, any increase in visitation relative to Alternative B due to restructuring of these facilities would be expected to be negligible. Other sensitive receptors that could possibly be affected by construction or enhancement of public access facilities are residences along Sir Francis Drake Boulevard adjacent to the possible future extension of the southern perimeter trail to Inverness Park. However, noise generated near homes along Sir Francis Drake Boulevard by the possible future extension of the southern perimeter trail to Inverness Park would be largely masked by the roadway noise and would have no more than a negligible adverse effect on ambient noise relative to baseline conditions.

The intensity of public access-related impacts to ambient noise must be balanced with the fact that these areas are currently subject to higher ambient levels of noise due to operation of the dairy, worker housing, and the existing informal path on the East Pasture levee. As discussed under the No Action Alternative and Alternative A, this alternative would potentially have a beneficial effect on soundscapes in that it would generate a small, but detectable decrease in noise associated with intensive agricultural operations such as dairies, twice daily milk truck stops; hay truck and other truck deliveries; operation of backhoes, dump trucks, and other construction equipment; and vehicle and conversation noise of ranch workers. In addition, a certain amount of noise is already generated in this area by people using the informal path that currently exists on the levee, who usually park near 3rd and C Streets. On Mesa Road, noise has been generated by ranch

workers living in housing on the north side of Tomasini Creek, as well as by earthmoving equipment used by the Giacominis for ranch maintenance activities in the East Pasture.

Under Alternative C, noises associated with dairy operations would be eliminated, while noise associated with visitation and use of public access facilities would either be considered an increase relative to public access-related noise generated under baseline conditions (southern perimeter trail) or a new source of noise (two spur trails on eastern perimeter). Because public access-related noise would increase relative to baseline conditions and would be more constant than the agricultural-related noise eliminated by close of the dairy, this alternative would still have an overall adverse effect on ambient noise, although impacts would be reduced relative to Alternative B to negligible rather than minor. As with other alternatives, changes in noise levels would not violate the county noise ordinance of 60 dB-Ldn.

Proposed Mitigation Measures: Proposed measures to reduce noise levels to the maximum extent practicable in sensitive construction zones would be the same as described under Alternative A.

Effectiveness of Proposed Mitigation Measures: Implementation of the proposed mitigation measures would reduce the intensity of impacts in sensitive construction zones to less-than-significant levels under CEQA.

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative A.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative C on ambient noise in the local community during construction and after implementation would generally range from negligible adverse to major or substantial adverse, with substantial adverse effects mitigated to less-than-significant levels under CEQA and moderate under NEPA. Under Alternative C, the extent and degree of restoration would be expanded to include Olema Marsh and more active restoration actions in the Giacomini Ranch. Construction or expansion of public facilities would be scaled back relative to Alternatives A and B, although there is still a potential to extend the southern perimeter trail to Inverness Park and construct a small levee around lower-elevation private properties on the east side of Sir Francis Drake Boulevard. In general, construction would have only negligible to minor effects on noise along local and regional roadways associated with hauling of excavated sediments and negligible effects on most of the sensitive receptors or residences near the Project Area because of attenuation of noise with distance and natural sound barriers. However, the close proximity of homes on Levee Road, 3rd and C Streets in Point Reyes Station, and Sir Francis Drake Boulevard to three major construction areas would potentially result in temporary, short-term noise levels exceeding 75 dBA. This would be considered a major impact under NEPA and a substantial and significant impact under CEQA. While these impacts cannot be eliminated, they have been reduced to a less-than-significant level under CEQA and a moderate level under NEPA through adoption of noise-reducing construction Best Management Practices.

The primary effects of this alternative on ambient noise conditions after implementation would be associated largely with increases in visitation and traffic due to construction or expansion of public access structures, facilities, and attractions/uses. Projected increases in visitation and related increases in vehicle traffic would be lower than those under Alternatives A and B and would, therefore, still have barely detectable or very negligible impacts on ambient noise conditions along local and regional road corridors. However, impacts may be higher in areas located next to trailheads due to noise from engine starting and vehicle acceleration and deceleration. Under this alternative, the Point Reyes Station trailhead for the southern perimeter trail is moved from 3rd and C Streets to the Green Bridge, and the ADA-compliant component on this trail is eliminated and switched to the Mesa Road spur trail. This change should decrease impacts to sensitive receptors near 3rd and C Streets, although it may increase impacts slightly to those near the Mesa Road spur trail relative to Alternative B. In addition, potential construction of homes along C Street could also contribute cumulatively to an increase in ambient noise levels for homes along 3rd and C Streets, although these cumulative impacts would not be expected to exceed minor at most. Ultimately, the increase in public access-related noise associated with expansion or construction of public access facilities and potential construction of homes would be offset to some degree by the elimination of noises associated with operation of the dairy, although visitation and use of public access facilities would be expected to generate a more constant level of noise than the intermittent or periodic loud and sharp noises produced by milk trucks, hay trucks, and

earthmoving equipment used for maintenance. Therefore, overall, project implementation would still be expected to potentially have a negligible adverse effect on ambient noise conditions for at least certain areas within the local community, although noise levels would not exceed the county noise ordinance of 60 dB-Ldn.

Alternative D

Analysis: The effects of Alternative D on ambient noise in the local community would be similar to Alternative C with some exceptions, generally ranging from negligible beneficial to major or substantial adverse (Table 49). Under this alternative, restoration actions would be expanded in the East Pasture to include replacement of the Tomasini Creek culvert at Mesa Road. The public access component would be scaled back considerably, with elimination of the bridge on the southern perimeter trail and the Mesa Road spur trail. While distance and barriers would attenuate most of the construction noise to minimal levels, the amount of construction in the three sensitive construction zones would remain similar to that under Alternative C. Therefore, construction in these areas would have the potential to generate noise localized, short-term noise levels exceeding 75 dBA, which would constitute a major impact under NEPA and a substantial and significant impact under CEQA. These effects would be mitigated to a less-than-significant level under CEQA and a moderate level under NEPA using the mitigation measure BMPs described under Alternative A.

Construction: Under this alternative, approximately 147,218 cubic yards of excess sediment excavated would be hauled to quarries within the Seashore for disposal (Figure 7). Because of this, the number of potential truck trips would climb from approximately 200 under the No Action Alternative and 6,275 under Alternative C to 7,400 under Alternative D. This analysis assumed that two (2) to five (5) 20 cubic-yard trucks would be running simultaneously for a longer period of time relative to Alternative B (E. Polson, Polson Civil Engineering, *pers. comm*.), with the total number of daily truck trips not exceeding exceed 40 roundtrips or 80 single trips. As with the other alternatives, it also took into account vehicle-related noise associated with commuting of construction personnel to the Project Area. Under this alternative, trucks hauling sediment from the East Pasture would be traveling through Point Reyes Station from either the Mesa Road or C Street access points and then would likely use Sir Francis Drake Boulevard to reach the primary disposal locations in the Seashore located near Pierce Point Road (Figure 7). Trucks hauling sediment from Olema Marsh and the West Pasture would primarily be using Sir Francis Drake Boulevard and, for Olema Marsh, either Bear Valley or Levee Roads.

Despite this increase in the estimated total number of truck trips, impacts to noise levels along local and regional roadways would still be estimated to be negligible, because of the moderate to high existing ambient noise conditions along these busy road corridors and the extended timeframe over which hauling would occur. This alternative would be constructed over six to seven construction seasons, because it includes the Tomasini Creek culvert, public access, and Olema Marsh, which would be restored under a phased, adaptive approach. As with the other alternatives, the only noticeable increase in estimated noise from hauling occurred along Pierce Point Road, where the lower overall traffic volume on this road, combined with the steeper road gradient, would cause a minor short-term, localized change in ambient noise levels estimated at approximately 4 dBA. Taking into account the length of travel on each of the roads, truck hauling during construction would still be expected to result in no more than an overall adverse negligible effect on ambient noise conditions along local and regional roadways.

Project Implementation: After implementation, effects on soundscape resources or ambient noise conditions would result largely from changes in visitation and the number of vehicles traveling to and from the Project Area, because of the expansion in public access structures, facilities, and attractions/uses. In general, the effects of Alternative D on ambient noise after implementation would be much lower than the other alternatives, because of the considerable scaling back of the public access component. The magnitude of a potential increase in visitation and visitor-related traffic would be expected to result in no more than a very negligible effects on ambient noise along local and regional road corridors and negligible adverse effects on ambient noise conditions for sensitive receptors near trails or trailheads. As with Alternative C, the Point Reyes Station trailhead for the southern perimeter spur trail would originate at the Green Bridge rather than at 3rd and C Streets, thereby decreasing impacts to these residences. The elimination of the bridge also decreases the number of potential trail users, reducing the potential impact for noise impacts to residents on Levee Road. The addition of an ADA-compliant trail in White House Pool County park to Alternative D in the FEIS/EIR would not be expected to have more than a negligible adverse effect on ambient noise levels. Elimination of the Mesa Road spur trail would decrease the potential for impacts to residences on the Point Reyes Mesa.

The intensity of these impacts is reduced even further by the fact that these areas are currently subject to higher ambient levels of noise due to operation of the dairy, worker housing, and the existing informal path on the East Pasture levee. As with the other alternatives, noises associated with dairy operations such as milk trucks, hay trucks, earthmoving equipment used for dairy maintenance and ATVs would be eliminated. Ultimately, this alternative would have an overall negligible beneficial effect on ambient noise conditions, because noises associated with dairy would be eliminated, and public access-related noise would be expected to be much lower than under the other alternatives and only slightly higher than under baseline conditions.

Proposed Mitigation Measures: Proposed measures to reduce noise levels to the maximum extent practicable in sensitive construction zones would be the same as described under Alternative A.

Effectiveness of Proposed Mitigation Measures: Implementation of the proposed mitigation measures would reduce the intensity of impacts in sensitive construction zones to less-than-significant levels under CEQA.

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative A.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Despite increases in the extent and degree of restoration, Alternative D would have very similar project-related and cumulative effects on ambient noise in the local community during construction and after implementation as Alternative C, with effects ranging from negligible beneficial to major or substantial adverse. Substantial impacts of construction-related effect on sensitive receptors would be reduced to less-than-significant levels under CEQA and moderate levels under NEPA through incorporation of noise-reducing construction Best Management Practices. Other construction-related noise impacts would generally range from negligible to minor. Following implementation, this alternative would be expected to have a negligible beneficial effect on ambient noise. Noise associated with the dairy such as milk trucks, hay trucks, earthmoving equipment used for dairy maintenance, ATVs, and other agricultural operations would be eliminated with its closure, while noise associated with visitation to new or expanded public access facilities would be much lower than under other alternatives and only slightly higher than under baseline conditions.

Water Resources – Hydraulics and Hydrologic Processes

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

In recent decades, more local, state, and federal agencies have adopted policies regarding hydrologic processes, specifically the need to minimize hydrologic alterations and maintain natural hydrologic processes for improved water quality, viable fish and wildlife populations, and ecologically healthy fish and wildlife habitats. In its 2006 Management Policies, the Park Service urges parks to re-establish natural functions and processes altered by changes to hydrologic patterns and sediment transport, acceleration of erosion and sedimentation, floodplains, and disruption of natural processes to conditions characteristic of the surrounding environment (NPS 2006, Sections 4.1.5 and 4.6.4). Local agencies and plans also promote preservation and restoration of natural hydrologic processes and functions and have established policies restricting impoundments, diversions, channelization, and removal of riparian habitat or buffer. These policies and plans are discussed in more detail under Water Resources in Chapter 3.

Significance criteria developed by the county and CEQA for water resources pertaining to hydraulics and hydrologic processes include 1) substantial changes in absorption rates, drainage patterns (including alteration of the course of a stream or river), or the rate and amount of surface runoff; 2) substantial changes in drainage patterns that would result in substantial erosion and siltation on- or off-site; and 3) substantial changes in the flow of surface water or ground waters, including currents, rate of flow, and the course or direction of water movement. The DOI has mandated that federal agencies in DOI must address actions that would have adverse or beneficial impacts to floodplains.

General Assumptions and Methodologies

- The purpose of the proposed project is to restore natural hydrologic processes and functions, with the degree of restoration varying among proposed alternatives.
- The extent to which processes and functions can be restored within the Project Area and immediate vicinity is constrained to some degree by the need to maintain existing public services and safety (e.g., county roads, not increase potential for flooding of homes and roads, minimize saltwater intrusion into local municipal groundwater supplies), as well as provide opportunities for public access and enjoyment of the restored wetland.
- Some aspects relating to sediment transport processes are evaluated in other sections of this chapter, specifically potential changes to water quality relating to transport of suspended sediment (Water Resources – Water Quality) and potential changes in aggradation or erosion of Lagunitas Creek channel bed (Public Health and Safety – Flooding).

Listed below are methodologies for impact thresholds related to hydrologic processes, including specific assumptions or details on methodologies.

Changes in Surface Tidal Processes: Impact thresholds focus on changes in the area subject to surface tidal processes relative to baseline conditions, in which surface tidal processes have either been eliminated or reduced as a result of levee and road construction and installation of tidegates and culverts (Table 50). Changes in surface tidal processes represent estimates of the area subject to daily tidal action during Mean High Water (MHW) tide events under the various alternatives (KHE 2006a). Daily tidal action to MHW is used to represent tidal prism, where mean high water is 4.64 feet MLLW. No construction or short-term impacts to surface tidal hydrologic processes would be anticipated.

TABLE 50. SURFACE TIDAL HYDROLOGIC PROCESSES

Source: Park Service Management Policies, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed **Duration**: Long-Term	
No Impact	There would be no potential for impact to surface tidal processes associated with the proposed project.
Negligible	There would be a negligible change (≤ 10 percent) in the extent of area subject to surface tidal hydrologic processes during daily tides.
Minor	There would be a minor change (≤ 25 percent) in the extent of area subject to surface tidal hydrologic processes during daily tides.
Moderate	There would be a moderate change (≤ 50 percent) in the extent of area subject to surface tidal hydrologic processes during daily tides.
Major or Substantial	There would be a substantial or major change (> 50 percent) in the extent of area subject to surface tidal hydrologic processes during daily tides.

Changes in Surface Freshwater Hydrologic Processes: Impact thresholds for surface freshwater hydrologic processes focus on changes in the number of infrastructure facilities (e.g., tidegates, culverts, dams, roads, levees, wells or pumps) or management practices (e.g., creek dredging, creek straightening or realignment) that affect fluvial processes and related properties, such as sediment transport, frequency and pattern of flood flows, channel movement or migration, water residence time, etc. (Table 51). Because changes in surface area affected by increases or decreases in infrastructure or creek management practices occur relatively infrequently when flood flows are able to overtop creek bank or levees, surface area was not considered the best overall indicator of potential change in freshwater processes, although changes in floodplain capacity is evaluated later in this section.

To evaluate how the proposed project would affect freshwater hydrologic processes, the number of existing structures, facilities, or management practices for each freshwater system or subwatershed in the Project Area was compared between baseline or existing conditions (See Table 8 in Chapter 3) and the various alternatives. For each alternative, the number of structures or facilities removed, maintained, or installed – some alternatives include installation of a bridge or public access infrastructure -- was evaluated along with the number of management practices that would be discontinued, maintained, or initiated. A partially weighted scoring system that takes into account the relative degree of change (e.g., breached versus completely removed) and the number of hydrologic or geomorphic processes or conditions that might be affected by each

type of structure, facility, or management practice was used in analysis. To represent what effect the proposed project might have on watershed function, this analysis also evaluates the effect of the proposed project relative to constraints on freshwater hydrologic processes within each of the respective subwatersheds. (Only the mainstems of Lagunitas Creek and Bear Valley Creek are incorporated.) In addition, temporary effects on freshwater hydrologic processes associated with construction are also evaluated. These could include coffer dams used to dewater aquatic areas to allow for improved construction access.

TABLE 51. SURFACE FRESHWATER HYDROLOGIC PROCESSES

Source: Park Service Management Policies, CCC/LCP Zone II, Marin CWP, Community Plan **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed **Duration**: Long-Term	
No Impact	There would be no potential for impact to fluvial or surface freshwater hydrologic processes associated with the proposed project.
Negligible	There would be a negligible change (≤ 10 percent) in the number of infrastructure, facilities, and management practices affecting fluvial or surface freshwater hydrologic processes. Changes would have a barely detectable effect on the overall number of infrastructure, facilities, and management practices (≤ 5 percent) affecting freshwater hydrologic processes within the overall subwatersheds.
Minor	There would be a minor change (±11 - 25 percent) in the number of infrastructure, facilities, and management practices affecting fluvial or surface freshwater hydrologic processes. Changes would have a measurable effect on the overall number of infrastructure, facilities, and management practices (≤ 10 percent) affecting freshwater hydrologic processes within the overall subwatersheds.
Moderate	There would be a moderate change (± 26 - 50 percent) in the number of infrastructure facilities and management practices affecting surface freshwater hydrologic processes. Changes would have an appreciable effect on the overall number of infrastructure, facilities, and management practices (≤ 25 percent) affecting freshwater hydrologic processes within the overall subwatersheds.
Major or Substantial	There would be a major or substantial change (> 50 percent) in the number of infrastructure facilities and management practices affecting surface freshwater hydrologic processes. Changes would have a striking effect on the overall number of infrastructure, facilities, and management practices (> 25 percent) affecting freshwater hydrologic processes within the overall subwatersheds.

Changes in Hydrologic Functions - Floodplains: Impact thresholds focus on changes in floodplain storage or cumulative volume of inundated waters in cubic feet that are stored or move through Lagunitas, Fish Hatchery Creek, and Tomasini Creek floodplains during the 2- and 100-year flood events relative to existing or baseline conditions (Table 52). These particular flood events were chosen for analysis, because levees have reduced the frequency of and area available for storage during flooding or periods when creek waters overtop banks and spill onto adjacent floodplains and marshplains, particularly for floods with recurrence intervals ≤ 3.5 years. Cumulative floodwater storage volume was estimated using computerized hydraulic models developed for the various alternatives and simulating floods of all the flood recurrence intervals, including the 2- and 100-year flood events (KHE 2006a). Cumulative volume takes into consideration not only peak total storage capacity, but the total volume of water that moves through off-channel storage areas during an entire storm event, which may include several peaks in flood flow depending on the intensity and pattern of rainfall. Hydraulic models include extreme storm tide conditions as freshwater flooding and extreme tides often coincide, thereby increasing the volume of floodwaters (KHE 2006a). No construction or short-term impacts to surface tidal hydrologic processes would be anticipated.

TABLE 52. HYDROLOGIC FUNCTIONS - FLOODPLAINS AND FLOODWATER RETENTION

Source: Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed **Duration**: Long-Term	
No Impact	There would be no potential for impact to floodplains or floodplain storage associated with the proposed project.
Negligible	There would be a negligible change (±10 percent) in floodplain storage or cumulative volume of floodwaters in Lagunitas Creek during the 2- and 100-year flood events associated with the proposed project.
Minor	There would be a minor change (±11 - 25 percent) in floodplain storage or cumulative volume of floodwaters in Lagunitas Creek during the 2- and 100-year flood events associated with the proposed project.

TABLE 52. HYDROLOGIC FUNCTIONS - FLOODPLAINS AND FLOODWATER RETENTION

Moderate	There would be a moderate change (± 26 - 50 percent) in floodplain storage or cumulative volume of floodwaters in Lagunitas Creek during the 2- and 100-year flood events associated with the proposed project.
Major or Substantial	There would be a major or substantial change (> 50 percent) in floodplain storage or cumulative volume of floodwaters in Lagunitas Creek during the 2- and 100-year flood events associated with the proposed project.

Changes in Hydrologic Processes – Sediment Transport Dynamics: Impact thresholds focus on changes in deposition of suspended sediment onto floodplains or marshplains during the 2-year flood event (Table 53). Sediment transport rates for different stream discharge or flow rates were derived from sediment yield rating curves for suspended sediment at the Lagunitas Creek near Point Reyes Station gauge (USGS Station 11460600) developed by H. Esmaili & Associates (1980) for Marin Municipal Water District. The mainstem of Lagunitas Creek at the Point Reyes gauge demonstrated the highest rates (if not total loads) of sediment transport at lower flows (streamflows < 1,000 cfs), thereby making the 2-year flood event the most appropriate modeled flow for analysis.

The potential movement of sediment onto floodplains in the Project Area is restricted by poor connectivity between creeks and floodplains during smaller and more frequent flood events (< 10-year flood events). Smaller flow events such as these often constitute the "dominant discharge" streamflows at which most of the sediment transport within many systems occurs, at least on average. During the 1979-1980 study, the rate of sediment transport in the lower portions of Lagunitas Creek just upstream of the Project Area showed signs of declining at the 1-year flood event, although the total load continued to increase with streamflow at a slower rate, with some of the most extensive sedimentation in recent decades observed after the 100-year flood event in 1982 (H. Esmaili and Associates 1980; Anima et al. 1988). Based on the sediment rating curve developed by H. Esmaili & Associates (1980), approximately 50,000 tons per day of suspended sediment would potentially move through the Project Area during a 2-year flood event.

This analysis assumes that the bedload being transported in Lagunitas Creek largely remains within the creek channel and that most of the sediment that would be deposited on floodplains and marshplains would be suspended sediment such as fines (silts, clays) and medium-grained sands (Dunne and Leopold 1978). Only a portion of floodwaters carrying sediment during flood events end up on the floodplains or marshplains, with some being deposited in lower elevation off-channel features such as oxbows and secondary channels or within the active channel itself (Heimann 2001). Sediment yield for the stream discharge associated with the 2-year flood event (3,531cfs; KHE 2006a) at the Point Reyes Station gauge on Lagunitas Creek was then factored by the percentage of cumulative flood volume of waters moving through the East and West Pasture floodplains under the various alternatives to estimate the proportion of sediment in tons per day likely to be deposited on floodplains during overbank flooding. As with bedload sediment transport, suspended sediment loads are likely to be variable both vertically and horizontally within floodwater flows, however, for the purposes of this analysis, suspended sediment was assumed to be relatively uniformly distributed throughout the water column. In some systems, sediment deposition on floodplains has shown a strong linear relationship with both cumulative suspended sediment load and cumulative streamflow, with these variables explaining up to 82 percent of the variability in floodplain sediment deposition (Heimann and Roell 2000). No construction or short-term impacts to surface tidal hydrologic processes would be anticipated.

TABLE 53. HYDROLOGIC PROCESSES – SEDIMENT TRANSPORT

Source: Park Service Management Policies, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area/Watershed **Duration**: Long-Term	
No Impact	There would be no potential for impact to sediment deposition rates in the Project Area or sedimentation within the southern portion of the Tomales Bay watershed.
Negligible	There would be a negligible change (±5 percent) in sediment deposition rates in the Project Area and delivery of sediment by Lagunitas Creek to the southern portion of the Tomales Bay watershed.
Minor	There would be a minor change (±6-10 percent) in sediment deposition rates in the Project Area and delivery of sediment by Lagunitas Creek to the southern portion of the Tomales Bay watershed.
Moderate	There would be a moderate change (± 11- 25 percent) in sediment deposition rates in the Project Area and delivery of sediment by Lagunitas Creek to the southern portion of the Tomales Bay watershed.
Major or Substantial	There would be a major or substantial change (> 25) in sediment deposition rates in the Project Area and delivery of sediment by Lagunitas Creek to the southern portion of the Tomales Bay watershed.

Impact Analysis

TABLE 54. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR WATER RESOURCES –HYDRAULICS AND HYDROLOGIC PROCESSES

All impacts would be considered Project Area and are separately analyzed for Construction and Short-Term/Long-Term.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Surface Tidal Hydrologic Processes	Beneficial-Negligible	Beneficial-Moderate	Beneficial-Moderate	Beneficial-Moderate	Beneficial-Moderate
Surface Freshwater Hydrologic Processes (Project Area/ Watershed)	Beneficial-Minor/ Negligible	Beneficial-Minor/ Minor	Beneficial-Moderate/ Minor	Beneficial-Moderate/ Moderate	Beneficial-Moderate/ Moderate
Hydrologic Functions – Floodplains and Floodwater Retention	Beneficial — Negligible	Beneficial - Moderate	Beneficial - Major	Beneficial - Major	Beneficial - Major
Hydrologic Processes – Sediment Transport (Project Area/ Watershed)	Beneficial-Negligible/ Negligible	Beneficial-Major/ Minor	Beneficial-Major/ Moderate	Beneficial-Major/ Moderate	Beneficial-Major/ Moderate

TABLE 55. ESTIMATION OF CHANGES IN HYDRAULIC AND HYDROLOGIC PROCESSES FOR THE GIACOMINI WETLAND RESTORATION PROJECT.

	Existing Conditions	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Surface Tidal Hydrologic Processes						
Extent of Area Inundated by MHW (Acres)	10.9	20.9	200.0	210.4	231.4	252.3
(Percent Change)						
Surface Freshwater Hydrologic Processes						
Estimated Percent Change in the Number of Infrastructure, Facilities, and Management Practices						
Project Area		12	19	37	39	44
(Watershed)		(5)	(10)	(10)	(15)	(17)
Hydrologic Functions – Floodplains and Floodwater Retention						
Cumulative Floodwater Volume – 2-year event (acre-feet)						
Project Area	101	101	1085	1873	2049	2079
Lagunitas Creek	*9972*	*9972*	*8971*	*8104*	*7999*	*7973*
Hydrologic Processes – Sediment Transport						
Estimated Sediment Deposition from Lagunitas Creek (tons/day) – 2-year event						
Project Area	0	0	4,768	8,896	9,397	9,521
Tomales Bay	*50,000*	*50,000*	*45,232*	*41,104*	*40,603*	*40,479*

No Action Alternative

Analysis: The No Action Alternative would generally have negligible to minor beneficial effects on water resources and hydrologic processes and functions (Table 54).

Under the No Action Alternative, levees in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would remain, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities. There would be only a negligible change in surface tidal hydrologic processes or areas exposed to daily tidal action, floodplain area and the volume of water moving through floodplains, and sediment deposition on floodplains relative to baseline or existing conditions, at least in the immediate long-term future.

Under the No Action Alternative, there is a potential for leased grazing of dairy heifers or beef cattle on the Giacomini Ranch lands in the future, which would be in accordance with the parks' GMP. Leasing would undergo a separate environmental review process, but it is likely that, if lease or leases were approved, that the Seashore would institute restrictions on resource setbacks or setbacks from creeks and certain wetland areas, as well as the intensity, duration, and timing of grazing. In addition, certain creeks in the West Pasture would continue to be dredged to eliminate flood risks to adjacent private residences.

Levees would continue to act as constraints on floodplains and floodwater retention, although these constraints are limited to smaller flood events such as the 2- to 10-year floods. Without maintenance, levees would be expected to degrade over time, thereby increasing the potential for greater change in these processes and functions, however, the rate of degradation is difficult to predict and location of breaching and flooding would be clustered around large scale storm events. During this same time frame, long-term trends in sea level rise could also cause an increase in the potential extent of area inundated by tides, especially on upstream reaches of Tomasini Creek and Olema Marsh. Levees and tidegates would generally restrict the potential for surface tidal inundation in the East and West Pastures, however, recently published studies suggest that sea level rise rates may be much greater than predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006).. This sea level rise, when combined with levee degradation, could lead to intrusion of tidal influence into large portions of the Giacomini Ranch pastures, particularly areas below 4 ft NAVD88.

Under the existing purchase agreement with the Giacomini Trust, the Giacomini Ranch dairy had a 7-year Reservation of Use agreement that allowed the Giacomini family to continue dairying until the agreement expires in spring 2007. At that time, the dairy will close, and agricultural management practices associated with dairying will cease. These management practices include crossing of Lagunitas Creek by Giacomini Ranch dairy cows; infrequent discharge of waters in East Pasture ditch system to Lagunitas Creek; periodic maintenance of levees and creek crossings; dredging of creeks for improved pasture drainage; disposal of sediments; and diversion of waters from Lagunitas Creek and Fish Hatchery Creek for pasture irrigation and livestock watering purposes. The Park Service will also dedicate appropriative irrigation water right to beneficial instream uses. These changes will have a beneficial effect on both tidal and surface water hydrologic processes, resulting in a 12 percent decrease in the number of infrastructure, facilities, and management practices that affect surface freshwater hydrologic processes relative to existing conditions (Table 55).

Tidal Prism: Through the limited wetland mitigation component, the extent of area inundated by daily tidal action (Mean High Water) and available floodplain within the East Pasture would be increased by 10 acres or approximately 2 percent (Table 55). The tidegate/flashboard dam structure on Tomasini Creek would not be removed, but would be left in place to maintain subtidal conditions during low tides for the federally endangered fish species, tidewater goby (*Eucyclogobius newberryi*). The tidegate/flashboard dam structure currently does not function properly, allowing the full extent of high tides into the diked portion of Tomasini Creek. The structure prevents complete outflow during low tides, controlling a residual base water level at least 1- to 2 feet above the deepest part of the channel (KHE 2006a). Peak high tides within the diked portion of Tomasini Creek reach 7 feet NAVD88 and are not attenuated significantly as distance from the tidegate increases (KHE 2006a). Estuarine circulation patterns and salinities would continue to be dampened by the appreciable amount of groundwater inflow that comes from the Point Reyes Mesa, maintaining brackish water

salinities for most of the summer and fall despite the strength of tidal influence. During high tides, there would still continue to be some muted tidal action in the shallowly flooded sparsely vegetated flats in eastern portion of the East Pasture from Tomasini Creek waters flowing through a culvert in the Tomasini Creek berm.

Tidegates which facilitate the existing muted tidal regime in the northern portion of the West Pasture would also remain on Fish Hatchery Creek. The existing condition has been documented to cause seasonal spikes in salinity in the large freshwater marsh adjacent to Sir Francis Drake Boulevard. The West Pasture tidegate mutes the tidal regime to fluctuate between 3.4 and 5.25 ft NAVD88. Circulation patterns and salinities in the West Pasture would continue to be strongly influenced by perennial freshwater flow from Fish Hatchery Creek, as well as several other small drainages. In Olema Marsh, the box culvert at Levee Road would continue to act as a grade control structure that limits tidal exchange into a very limited portion of the marsh to tides exceeding 4.5 ft NAVD88 (KHE 2006a).

Floodplain/Floodwater Retention: Under this alternative, levees would continue to act as constraints on floodplains and floodwater retention, although these constraints are limited to smaller flood events such as the 2- to 10-year floods. Under these smaller flow events, floodplains for Lagunitas and Tomasini Creeks within the Project Area are limited to the channel and narrow fringes of marshplain on the outboard of the levees. At its upstream end, the East Pasture would flood during 3.5-year flood events or during storms that occur, on average, every 3.5 years, which is reflected in the relatively low cumulative volume of floodwaters that move through the East Pasture and Tomasini Creek under a 2-year event (~97 acre-feet; KHE 2006a). Almost all of that water comes from Tomasini Creek, which is hydrologically disconnected from the adjacent East Pasture by a levee. Overtopping of the creek bank in the East Pasture downstream of White House Pool would occur less frequently (7-year flood event). On larger floods, the entire pasture would be inundated, with cumulative floodwater volume during a 100-year event climbing to approximately 19,000 acre-feet (KHE 2006a). Tomasini Creek would only reach levels sufficient to overbank flood onto floodplains during some of the larger flood events (KHE 2006a). Under this alternative, inundated area in the East Pasture would range from 1.8 acres under the 2-year flood event, with the entire 350-acre East Pasture flooded during a 50-year event (KHE 2006a). Once flooded, floodwaters in the East Pasture would be expected to become impounded – the bathtub effect -- for days or even weeks in the lower elevation northern portions of the East Pasture just as they do now, because drainage outflow is restricted by the levees, concrete spillway, and undersized or poorly functioning tidegates.

Flooding of the West Pasture by Lagunitas Creek would not occur generally until stream discharge reached levels comparable to a 12-year flood event, although the numerous Inverness Ridge drainages that flow into the West Pasture would continue to cause flooding problems for residents adjacent to Sir Francis Drake Boulevard (KHE 2006a). An analysis of the effect of the proposed project on flooding issues related to public health and safety are discussed later in this Chapter. The inundation area in the West Pasture would be larger (76 acres) than the East Pasture under the 2-year event because of flooding from Fish Hatchery Creek and the other Inverness Ridge drainages, with the entire 200 acres completely flooded by the 500-year event (KHE 2006a). However, the cumulative volume of floodwaters in the West Pasture would be much lower, ranging from approximately 4 to 610 acre-feet (KHE 2006a). As with the East Pasture, the West Pasture also tends to impound waters in its northern portions because of levees, concrete spillway, and limited drainage outflow through the tidegate, although the degree of impoundment is considerably reduced. For Olema Marsh, the problem would continue to be levees and culverts holding water in, not keeping waters out. Under a 2-year flood event, the lack of hydraulic connectivity and inadequate drainage caused by the Levee Road culvert would maintain inundated area at 49 acres, with the extent of the 500-year flood event climbing only slightly to 67 acres (KHE 2006a). The only change in floodplains and floodwater storage would come from restoration of the 11-acre wetland, and this would be expected to have an extremely negligible effect on flooding patterns and storage, resulting in no change in the total volume of floodwaters moving through the Giacomini Ranch during a 2-year event relative to existing conditions (~101 acre-feet; Table 55).

Stream Power and Sediment Transport Patterns: The potential movement of sediment onto floodplains in the Project Area would continue to be restricted by poor connectivity between creeks and floodplains during smaller and more frequent flood events (< 10-year flood events). Smaller flow events such as these often constitute the "dominant discharge" streamflows at which most of the sediment transport within many systems occurs, at least on average. During the 1979-1980 study, the rate of sediment transport in the lower portions of Lagunitas Creek just upstream of the Project Area already showed signs of declining at the 1-year flood event, although the total load continued to increase with streamflow at a slower rate, with some of the most extensive sedimentation in recent decades observed after the 100-year flood event in 1982 (H. Esmaili and Associates 1980; Anima et al. 1988). Based on the sediment rating curve developed by H. Esmaili &

Associates (1980), approximately 50,000 tons per day of suspended sediment would potentially move through the Project Area during a 2-year flood event, with only negligible amounts potentially being deposited on Project Area floodplains. The only potential change in sediment deposition patterns on the Giacomini Ranch floodplains relative to baseline conditions would be negligible and would come from the 11-acre restored wetland in the northeastern portion of the East Pasture, which is unlikely to receive much in the way of sediment.

The potential movement of sediment onto floodplains would occur under higher flood flow events, although, at the higher flow velocities, a higher percentage of sediment may be transported through rather than deposited onto floodplains. During higher flood flows (~3.5- to 7-year flood events), floodwaters within Lagunitas Creek would crest the levee and flow into the East Pasture. Based on hydraulic modeling, stream power would drop sharply once floodwaters crest the levee, causing most, if not all, of the sediment to deposit in the southern portion of the pasture (KHE 2006a). This is the same sediment deposition pattern that exists now, although the Giacominis have preferentially directed flood flows to the southwestern corner of the East Pasture by removing or lowering levees in this area (KHE 2006a). Stream power would decrease appreciably under all flooding conditions in the northern portion of the East Pasture due to impoundment of floodwaters by the levee, concrete spillway, and tidegates/culverts (G. Kamman, KHE, *pers. comm*.). Similar to baseline conditions, stream power would remain extremely low throughout Olema Marsh, although transport capacity increases considerably near the Levee Road culvert outlet (KHE 2006a). In Lagunitas Creek, stream power during a 2-year flood event would be similar to baseline conditions and remain sufficient to maintain transport capacity of fine sediments, coarse sands, and fine gravels throughout the Project Area (KHE 2006a). Stream power would be even lower in the West Pasture than the East Pasture, with hydraulic modeling suggesting that there would be little to no sediment deposition under even higher flood flows (KHE 2006a).

The potential movement of sediment onto floodplains would occur under higher flood flow events, although, at the higher flow velocities, a greater percentage of sediment may be transported through rather than deposited onto floodplains. During higher flood flows (~3.5- to 7-year flood events), floodwaters within Lagunitas Creek would crest the levee and flow into the East Pasture. Based on hydraulic modeling, stream power would drop sharply once floodwaters crest the levee, causing most, if not all, of the sediment to deposit in the southern portion of the pasture (KHE 2006a). This is the same sediment deposition pattern that exists now, although the Giacominis have preferentially directed flood flows to the southwestern corner of the East Pasture by removing or lowering levees in this area (KHE 2006a). Stream power would decrease appreciably under all flooding conditions in the northern portion of the East Pasture due to impoundment of floodwaters by the levee, concrete spillway, and tidegates/culverts (G. Kamman, KHE, *pers. comm*.). Similar to baseline conditions, stream power would remain extremely low throughout Olema Marsh, although transport capacity increases considerably near the Levee Road culvert outlet (KHE 2006a). In Lagunitas Creek, stream power during a 2-year flood event would be similar to baseline conditions and remain sufficient to maintain transport capacity of fine sediments, coarse sands, and fine gravels throughout the Project Area (KHE 2006a). Stream power would be even lower in the West Pasture than the East Pasture, with hydraulic modeling suggesting that there would be little to no sediment deposition under even higher flood flows (KHE 2006a).

Tidal Power and Sediment Transport Patterns: Sediment can also be moved through estuarine sediment transport processes. Hydraulic modeling of tidal velocities during an average tidal month suggests that tidal velocities do not exceed 1.3 feet per second (ft/s) except in between White House Pool and the cattle crossing location (KHE 2006a). These velocities are typically insufficient to move loose sandy clay, much less the denser alluvial sands and gravels that primarily comprise the Lagunitas Creek streambed in the Project Area (KHE 2006a). The tidegate/culvert on Fish Hatchery Creek also appears to have reduced tidal velocities in the West Pasture, with velocities rarely exceeding 0.3 ft/s. In Olema Marsh, tidal velocities may exceed 2.6 ft/s, but tidal influence only extends into Bear Valley Creek and the marsh outlet for a very short distance (~60 feet; KHE 2006a). There is no tidal influence currently in the East Pasture, and the wetland mitigation/restoration would be expected to have only a very negligible effect, if any, on tidal velocities.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There are at least two currently proposed projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented, the Bear Valley Creek Watershed Enhancement Project and replacement of the Rift Zone Trail culvert. The Rift Zone Trail culvert would be

replaced in the summer of 2006 with a bridge. The Bear Valley Creek Project proposes to replace failing or underperforming hydrologic infrastructure at a number of locations on Bear Valley Creek within the Seashore boundaries. There is no definitive timeframe for construction of this project, but preliminary design for this project would be expected to have a cumulatively beneficial effect through improvement of hydrologic and ecological processes and functions in the upper portions of the Bear Valley Creek subwatershed, upstream of Olema Marsh. This effect would be appear to be negligible to minor for the proposed project as a whole, but it would be a major or substantial beneficial effect on the Bear Valley Creek subwatershed.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The No Action alternative would generally result in generally negligible to minor beneficial effects on hydrologic processes. The restoration would add approximately 10 acres intertidal habitat and would have only negligible effects on floodplains and floodwater storage and sediment transport processes. The No Action Alternative would have minor beneficial effects on fluvial or surface freshwater hydrologic processes in the Project Area, largely because of the elimination of intensive agricultural management practices. Should leasing grazing be approved after the Reservation of Use agreement expires in 2007, there would continue to be cattle grazing, but the Seashore would institute restrictions that would establish resource setbacks, grazing intensity, duration, and timing. These and the other changes would have minor beneficial effects on hydrologic processes in the Project Area, but only negligible beneficial effects on watershed function.

Alternative A

Analysis: Alternative A would have minor to major beneficial effects on water resources and hydrologic processes and functions (Table 54). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. Restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. Streambank armoring in the southwestern corner of the East Pasture creek bank would be removed and the banks regraded to a more stabile profile. Most of the actions under this alternative focus on removal agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways. The West Pasture and Olema Marsh would not be restored, and there would be no levee maintenance in the West Pasture.

Fluvial and Freshwater Processes: As with the No Action Alternative, the tidegate/flashboard dam structure on Tomasini Creek would not be removed, but would be left in place to maintain subtidal conditions during low tides for the federally endangered fish species, tidewater goby (*Eucyclogobius newberryi)*. Tidegates would also remain on Fish Hatchery Creek, preserving the muted tidal regime that currently exists in the northern portion of the West Pasture and causing seasonal spikes in salinity in the large freshwater marsh adjacent to Sir Francis Drake Boulevard. The West Pasture tidegate attenuates both the upper and lower portions of the tidal range, maintaining water levels between 3.4 and 5.25 ft NAVD88. Salinities in the West Pasture would continue to be strongly influenced by perennial freshwater flow from Fish Hatchery Creek and groundwater inflow from Inverness Ridge, as well as several other small drainages. In Olema Marsh, the box culvert at Levee Road would continue to act as a grade control structure that limits tidal exchange into a very limited portion of the marsh to tides exceeding 4.5 ft NAVD88 (KHE 2006a).

Under the existing purchase agreement with the Giacomini Trust, the Giacomini Ranch dairy has a 7-year Reservation of Use agreement that allows the Giacomini family to continue dairying until the agreement expires in spring 2007. At that time, the dairy will close, and agricultural management practices associated with dairying will cease. These management practices include crossing of Lagunitas Creek by Giacomini Ranch dairy cows; infrequent discharge of waters in East Pasture ditch system to Lagunitas Creek; periodic maintenance of levees and creek crossings; dredging of creeks for improved pasture drainage; disposal of sediments; and diversion of waters from Lagunitas Creek and Fish Hatchery Creek for pasture irrigation and livestock watering purposes. In addition, the infrastructure described above would be removed. The Park Service would also be redesignating the appropriative water right purchased with the Giacomini Ranch that has been used for irrigation for beneficial instream uses. However, certain creeks in the West Pasture would need to continue to be dredged to eliminate flood risks to adjacent private residences.

As part of the public access, the southern perimeter trail would include a prefabricated bridge across Lagunitas Creek, near the old summer dam location across from White House Pool County Park, The bridge would be designed to have no footings in the active channel or floodplain, thereby reducing effects on hydrologic processes. Future extension of the southern perimeter trail, in collaboration with the County of Marin, would connect White House Pool County park with a path along Sir Francis Drake that would either run alongside Sir Francis Drake Boulevard or move off the road at the southern end of the unrestored West Pasture onto a low-elevation boardwalk that would join back with Sir Francis Drake Boulevard in Inverness Park. The other infrastructure that would be constructed under Alternative A would be a culverted berm through trail on the eastern perimeter of the East Pasture that would be expected to have minor adverse effects on conveyance of the considerable surface water run-off from the Point Reyes Mesa that flows into Tomasini Creek. All of these actions would still be expected, however, to reduce constraints on surface freshwater hydrologic processes within the Project Area by almost 20 percent (Table 55).

Tidal Prism: Breaching of East Pastures would result in a moderate beneficial effect on the extent of area inundated twice daily by tides. Area inundated daily by tides in the East Pasture would be increased to approximately 189 acres, thereby also dramatically increasing available floodplain (Table 55). A considerable portion of the 350-acre East Pasture falls above intertidal topographic elevations and would not be subject to normal tidal flooding. These areas appear to be high either because of historic sediment deposition and/or past fill and grading events. Over the long-term, however, sea level rise could cause an increase in the potential extent of area inundated by tides, particularly in the East Pasture. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100 (Overpeck 2006). This rate sea level rise could lead to regular inundation of large portions of the East Pasture below 4 ft NAVD88.

Floodwater/Floodplain Retention: Under this alternative, the East Pasture would flood more frequently during smaller (1.5- to 2-year) flood events (KHE 2006a). However, Tomasini Creek flood flows would remain largely confined to the narrow channel and fringing marshplain along the East Pasture's perimeter. At its upstream end, the East Pasture would flood during 2-year events as compared to 3.5-year flood events under baseline or existing conditions (KHE 2006a). Lowering of the levee downstream of White House Pool would increase the frequency of flooding in this portion from a 7-year to a 1.5-year flood event (KHE 2006a). Cumulative floodwater volume during the 2-year flood event would increase from approximately 96 acre-feet under baseline or existing conditions to approximately 1,080 acre-feet under restored conditions (KHE 2006a). Almost all of the flood volume under baseline conditions comes from Tomasini Creek, which is hydrologically disconnected from the adjacent East Pasture by a levee.

As more water spills onto the floodplain, cumulative floodwater volume in Lagunitas Creek would drop from approximately 9,975 acre-feet to 8,970 acre-feet, a decrease of 10 percent (Table 55). Floodwater volume in the Project Area would climb from 101 acre-feet under the No Action Alternative (Fish Hatchery Creek and surface run-off volume) to 1,085 acre-feet during a 2-year event, all of which results from an increase in storage volume in the East Pasture (KHE 2006a; Table 55). Cumulative floodwater volume in the East Pasture during a 100-year event would nearly double from approximately 19,000 acre-feet to 35,000 acre-feet (KHE 2006a). Tomasini Creek would still continue to only reach levels sufficient to overbank flood onto floodplains during some of the larger flood events (KHE 2006a). Under this alternative, inundated area in the East Pasture would increase from 1.8 acres under the 2-year flood event to 298 acres, with the entire 350-acre East Pasture flooded during a 50-year event (KHE 2006a). Total inundated area in the Giacomini Ranch during a 2-year event would increase slightly from 78 acres under existing conditions (with the West Pasture drainages accounting for 76 acres and surface runoff the remainder) to approximately 374 acres under Alternative A. Floodwaters would be expected to move through the East Pasture more rapidly with removal of levees, concrete spillway, and undersized or poorly functioning tidegates, which may account for the dramatic increase in cumulative floodwater volume during the 100-year event when the East Pasture would be flooded, as well, under baseline or existing conditions.

As with the No Action Alternative, flooding of the West Pasture by Lagunitas Creek would not occur generally until stream discharge reached levels comparable to a 12-year flood event, although the numerous Inverness Ridge drainages that flow into the West Pasture would continue to cause flooding problems for residents adjacent to Sir Francis Drake Boulevard (KHE 2006a). An analysis of the effect of the proposed project on flooding issues related to public health and safety are discussed later in this Chapter. The inundated area in the West Pasture would be larger (76 acres) than the East Pasture under the 2-year event because of flooding from Fish Hatchery Creek and the other Inverness Ridge drainages, with the entire 200 acres completely flooded by the 500-year event (KHE 2006a). However, the cumulative volume of floodwaters in the West Pasture would be much lower than the East Pasture, ranging from approximately 4 to 610 acre-feet during the

2- and 100-year events (KHE 2006a). The West Pasture would continue to impound waters to some degree in its northern portions because of levees, concrete spillway, and limited drainage outflow through the tidegate, although the degree of impoundment is considerably reduced. For Olema Marsh, the problem would continue to be levees and culverts holding water in, not keeping waters out. Under a 2-year flood event, the lack of hydraulic connectivity and inadequate drainage caused by the Levee Road culvert would maintain inundated area at 49 acres, with the extent of the 500-year flood event climbing only slightly to 67 acres (KHE 2006a).

Stream Power and Sediment Transport Patterns: The potential movement of sediment onto floodplains in the Project Area would increase relative to baseline conditions in the East Pasture with breaching of the Lagunitas Creek levees, particularly during smaller and more frequent flood events (< 10-year flood events). Based on the sediment rating curve developed by H. Esmaili & Associates (1980), approximately 50,000 tons/day of suspended sediment would potentially move through the Project Area during a 2-year flood event. Under Alternative A, approximately 10 percent of this or almost 5,020 tons/day would potentially be diverted from Lagunitas Creek and flow through the East Pasture. The percentage of material deposited on floodplains versus transported through depends on a number of factors, but trapping efficiency is often higher under smaller floods such as 5-year events than larger ones such as 25-year events, because flood flow velocities on the floodplain are lower (Heimann 2001). A study on 11 natural (versus constructed) wetlands in the United States yielded a median trapping or removal efficiency rate for Total Suspended Solids (TSS; suspended sediment and other materials) of 76 percent, with a maximum removal rate up to 95 percent (Strecker et al. 1992) *in* Kadlec and Knight 1996).

Based on hydraulic modeling, stream power during average and maximum flood conditions in the East Pasture would be considerably higher under Alternative A relative to baseline conditions, but still not high enough to increase transport capacity across the floodplain (KHE 2006a). As with No Action Alternative, stream power would drop sharply once floodwaters crest the levee, causing most of the sediment to deposit in the southern portion of the pasture (KHE 2006a). This is the same sediment deposition pattern that exists now, although the Giacominis have preferentially directed flood flows to the southwestern corner of the East Pasture by removing or lowering levees in this area (KHE 2006a). These results would suggest that trapping efficiency, at least under the modeled flows, would be closer to the higher end of the range quoted earlier, with perhaps as much as approximately 4,770 tons/day potentially being deposited rather than transported through the East Pasture floodplain (Table 55). Sediment delivery to Tomales Bay could be reduced under Alternative A by almost 9.5 percent, which would be expected to have a minor beneficial effect (Table 55). Stream power in the West Pasture would remain similar to the No Action Alternative, because there would be no restoration activities in the West Pasture under Alternative A, with stream power similar to or slightly higher under maximum flooding to the East Pasture (KHE 2006a). Stream power in Lagunitas Creek would continue to be very similar to baseline conditions and sufficient to maintain transport capacity of fine sediments, coarse sands, and fine gravels throughout most of the Project Area, although there would be a slight decrease in stream power downstream of the cattle crossing (KHE 2006a).

Sediment deposition during floods can, over time, lead to net aggradation within floodplain areas and, ultimately, decrease trapping efficiency as vertical elevation of the floodplain rises. This trend tilts the evolutionary trajectory within wetland systems towards establishment of uplands, but within naturally dynamic systems such as estuaries, these trends are often counterbalanced by sea level rise (discussed above under Tidal Prism) and subsidence (either compaction- or fault-associated) that act to maintain or regenerate wetlands even within depositional environments.

Tidal Power and Sediment Transport Patterns: Sediment conveyance onto floodplains would have implications for the long-term sustainability of tidal channels created in the East Pasture, with sediment deposition tending to silt in channels and decrease drainage areas that maintain channel capacity. These forces would be counteracted to some degree by the energy of tidal flows, although, over the long-term, channels would be expected to decrease in size over time relative to constructed conditions to dimensions that can be maintained by the available drainage area and tidal currents. Hydraulic modeling showed that tidal velocities (~6.6 ft/s) during an average tidal month would be sufficient in the hydrologically reconnected East Pasture Old Slough to erode or maintain created channels at least in the northern portion of the East Pasture through mobilization of sediment with bulk densities as high as compact sandy clay, including potentially sediment deposited during overbank flooding (KHE 2006a). Tidal velocities in the West Pasture would remain low (< 0.5 ft/s) due to muting of tidal inflow and below the threshold for mobilization of loose sandy clay material (KHE 2006a). In Lagunitas Creek, tidal velocities would be almost identical to those under baseline conditions and the No Action Alternative, suggesting that there would not likely be any net changes in channel conditions (KHE 2006a).

With maintenance of existing tidal velocities in Lagunitas Creek, the influence of estuarine sediment transport processes such as gravitational circulation that involves resuspension of sediment along channel bottoms through strong tidal currents would likely remain negligible in the Project Area, because tidal currents are not sufficient to move the alluvial sands and gravels that comprise most of the streambed. However, tides and currents would continue to strongly influence circulation patterns within this reach of Lagunitas Creek such as gravitational circulation or density- or salinity-based stratification of waters that could at least create, particularly in areas where bathymetry changes abruptly such as shoals, zones where suspended sediment concentrations would reach a peak or maximum and preferentially fall out of suspension in the creek channel. While this could contribute to reductions in sediment delivery to Tomales Bay, the dominance of fluvial forces in this part of the estuary would suggest that fluvial sediment transport processes governing transport and deposition within in-stream and off-stream storage areas such as floodplains would largely dictate sediment delivery rates to the Bay, at least within the Project Area.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative A would result in minor to major beneficial effects on hydrologic processes. Under Alternative A, only the East Pasture would be restored, and most of the new public access infrastructure and facilities, including a bridge, would be located along the perimeter of the East Pasture and southwestern portion of the West Pasture. Breaching of the levees would restore tidal inundation to approximately 189 acres in the East Pasture, resulting in moderate beneficial impacts. Alternative A would have minor beneficial effects on fluvial or surface freshwater hydrologic processes in the Project Area, largely because of levee breaches and elimination of agricultural infrastructure and management practices. Some of the largest benefits would come from the moderate beneficial effects on floodplains and floodwater storage and sediment transport processes. Both the cumulative amount of floodwater and the amount of suspended sediment that potentially is deposited onto the East Pasture would increase dramatically under this alternative. The potential for increased sediment deposition on East and West Pasture floodplains would mean that flood flows could potentially reduce delivery of sediment to the southern portion of Tomales Bay by up to 9.5 percent or 4,770 tons/day during 2-year events, which would suggest that this alternative might have at least a minor beneficial effect on sedimentation patterns in southern portion of the watershed.

Alternative B

Analysis: Alternative B would have similar impacts to Alternative A on water resources and hydrologic processes, resulting in beneficial effects that range from minor to major (Table 54). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, including construction of the pedestrian access bridge across Lagunitas Creek near the old summer dam, and a planning area for continuation of the southern perimeter trail to Inverness Park. On the West Pasture north levee, a viewing area would replace the informal existing trail. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee, including removal of the north levee. The southern East Pasture creek bank would be restored through removal of rip-rap bank stabilization and regraded, where needed, to a more stabile profile. Some connection would be established between the East Pasture and Tomasini Creek through lowering of levees to allow overflow during flood events. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Fluvial or Freshwater Processes: Alternative B would have very similar effects to Alternative A on fluvial or surface freshwater hydrologic processes in the Project Area, with impacts characterized as minor and beneficial. This alternative would expand the amount of levee breaching and removal, remove the Fish Hatchery Creek tidegate, and eliminate of agricultural infrastructure and management practices from both the

East and West Pastures. As with Alternative A, the tidegate/flashboard dam structure on Tomasini Creek would remain to maintain subtidal conditions during low tides for the federally endangered fish species, tidewater goby (*Eucyclogobius newberryi*). Under this alternative, a small berm would potentially be constructed to reduce flooding of lower-elevation private properties on the east side of Sir Francis Drake Boulevard: while this would reduce fluvial influences of Lagunitas Creek on this property, it could potentially at least temporarily increase inundation or flooding of the property from surface flow and run-off from the Inverness Ridge. Approximately 5 acres of freshwater marsh would be created in the East Pasture Tomasini Triangle as alternate breeding habitat for the California red-legged frog, as removal of the Fish Hatchery Creek tidegate/culvert at the West Pasture north levee would increase tidal intrusion into the freshwater marsh that serves as its primary breeding habitat in the Giacomini Ranch currently. Creation of this marsh would constrain sheet flow of surface run-off and groundwater emerging from the base of the Point Reyes Mesa through berms constructed to prolong ponding of waters for creation of breeding California red-legged frog habitat and minimize potential tidal intrusion during extreme high or storm tides.

As with Alternative A, the southern perimeter trail would include a prefabricated bridge across Lagunitas Creek, near the old summer dam location across from White House Pool County Park, The bridge would be designed to have no footings in the active channel or floodplain, thereby reducing effects on hydrologic processes. Future extension of the southern perimeter trail, in collaboration with the County of Marin, would connect White House Pool County park with a path along Sir Francis Drake that would either run alongside Sir Francis Drake Boulevard or move off the road at the southern end of the unrestored West Pasture onto a low-elevation boardwalk that would join back with Sir Francis Drake Boulevard in Inverness Park. In addition, under Alternative B, the east perimeter trail would be constructed as a boardwalk trail (rather than culverted berm) to allow more of the surface water run-off from the Point Reyes Mesa to flow into Tomasini Creek unimpeded. All of these actions would still be expected to reduce constraints on surface freshwater hydrologic processes within the Project Area by almost 37 percent (Table 55).

Tidal Prism: Complete removal of the East Pasture levee would result in benefits similar to those described under Alternative A, restoring daily tidal flooding (up to MHW) to approximately 189 acres (KHE 2006a). Breaching of the West Pasture levee would have only a small effect on the extent of area inundated by daily tides, which would increase from 10.9 acres to 21.3 (KHE 2006a). Area inundated during daily tides within the Project Area would increase from approximately 200 acres under Alternative A to approximately 210 acres under Alternative B (KHE 2006a; Table 55). Breaching of the levees would primarily influence the extent of high tides (above MHW). Under current conditions, the tide gate facility creates a muted tidal regime with tides fluctuating between 3.4 and 5.25 ft NAVD88. While only limited new areas would be inundated at MHW, areas flooded during extreme high tides in the West Pasture would increase dramatically under Alternative B from 7.1 acres to 98.9 acres (KHE 2006a). This increase in tidal influence would be expected to increase tidal flooding of the freshwater marsh adjacent to Sir Francis Drake Boulevard, which supports breeding California red-legged frog (*Rana aurora draytonii*), a federally threatened species. Generally, this would result in a reduction in area of the marsh, not complete loss of this important freshwater habitat. This issue is discussed in more detail under Wildlife Resources.

Floodplain/Floodwater Retention: Under this alternative, both the West and East Pastures would flood more frequently during smaller (1.5- to 2-year) flood events (KHE 2006a). However, Tomasini Creek flood flows would typically remain confined to the narrow channel and fringing marshplain along the East Pasture's perimeter, except when flows are high to overtop the lowered section of levee. As with Alternative A, the East Pasture would continue to flood during 1.5- to 2-year events relative to the 3.5- to 7-year flood events required under baseline conditions to overtop levees (KHE 2006a). Cumulative floodwater volume during the 2-year flood event would increase from approximately 96 acre-feet under baseline or existing conditions to approximately 1,873 acre-feet, almost double the volume under Alternative A (1,085 acre-feet; KHE 2006a; Table 55). Almost all of the flood volume under baseline conditions comes from Tomasini Creek, which is hydrologically disconnected from the adjacent East Pasture by a levee. As more water spills onto the floodplain, cumulative floodwater volume in Lagunitas Creek would drop from approximately 9,972 acre-feet under existing conditions to 8,100 acre-feet, a decrease of 19 percent and nearly twice the reduction provided by Alternative A (Table 55). Cumulative floodwater volume during a 100-year event would still double relative to baseline conditions from approximately 19,000 acre-feet to 39,200 acre-feet, but the increase between Alternatives A and B is not nearly as great (KHE 2006a). Under this alternative, inundated area in the East Pasture would remain similar to that under Alternative A (~300 acres) under the 2-year flood event, increasing from 1.8 acres under baseline conditions (KHE 2006a). During a 50-year event, the entire 350-acre East Pasture would be flooded (KHE 2006a). Floodwaters would be expected to move through the East Pasture more rapidly with removal of levees, concrete spillway, and undersized or poorly functioning

tidegates, which may account for the dramatic increase in cumulative floodwater volume during the 100-year event relative to baseline or existing conditions.

Under Alternative B, flooding of the West Pasture by Lagunitas Creek would become more frequent, dropping from a 12-year recurrence interval to a 2-year recurrence interval (KHE 2006a). A certain percentage of floodwaters within the West Pasture would continue to be generated by the numerous Inverness Ridge drainages that flow into the West Pasture, which cause flooding problems for residents adjacent to Sir Francis Drake Boulevard (KHE 2006a). An analysis of the effect of the proposed project on flooding issues related to public health and safety is discussed later in this Chapter. The inundated area in the West Pasture under the 2-year event would actually decrease slightly from 76 acres to 70 acres, probably because removal of the concrete spillway, levees, and tidegate/culvert would decrease impoundment of waters. The entire 200 acres would be completely flooded by the 500-year event (KHE 2006a). The discrepancy between pastures in total inundation (50-year versus 500-year flood event) is reflected in the much lower cumulative floodwater volume in the West Pasture, which ranges from approximately 5 to 3,200 acre-feet during the 2- and 100-year events (KHE 2006a). For Olema Marsh, existing levees and culverts maintain a ponded water condition. Under a 2-year flood event, the ponded condition in the Olema Marsh would maintain inundated area at 49 acres, with the extent of the 500-year flood event climbing only slightly to 67 acres (KHE 2006a).

Stream Power and Sediment Transport Patterns: The potential movement of sediment onto floodplains in the Project Area would continue to increase under this alternative relative to baseline conditions with complete removal of the East Pasture levees and breaching of the West Pasture ones, particularly during smaller and more frequent flood events (< 10-year flood events). Under Alternative B, the percentage of suspended sediment from Lagunitas Creek moving through the East Pasture would increase from approximately 10 percent or 5,020 tons/day under Alternative A to 18.7 percent or 9,341 tons/day under Alternative B (KHE 2006a). Conversely, the percentage that would be diverted into the West Pasture would be much lower -- approximately 23 tons/day (KHE 2006a). The percentage of material deposited versus transported through depends on a number of factors, but often more deposition occurs under smaller floods such as 5-year events than larger ones such as 25-year events, because flood flow velocities on the floodplain are lower (Heimann 2001). A study on 11 natural (versus constructed) wetlands in the United States yielded a median trapping or removal efficiency rate for Total Suspended Solids (TSS; suspended sediment and other materials) of 76 percent, with a maximum removal rate up to 95 percent (Strecker et al. 1992 *in* Kadlec and Knight 1996)

Based on hydraulic modeling, stream power for the East Pasture would be almost identical to that under Alternative A, with trapping efficiency, at least under smaller flows, totaling approximately 8,875 tons/day (Table 55). Stream power would increase considerably in the West Pasture with breaching of levees, although transport capacity would still be too low to move sediment further than the edge of the floodplain (KHE 2006a). Sediment delivery to Tomales Bay could be reduced considerably under Alternative B from 9.5 percent (~4,770 tons/day) under Alternative A to 17.8 percent (~8,900 tons/day) under Alternative B (Table 55). This reduction would be expected to have a moderate beneficial effect on sediment and pollutant delivery to the Bay (Table 55).

While removal of the levees and increased off-channel storage of flood flows might be expected to decrease stream power in Lagunitas Creek channel and increase deposition or aggradation of sediment in this reach, hydraulic modeling suggests that, during 2-year flood events or typical channel-forming flows, the creek would continue to maintain transport capacity at least in the reach upstream of White House Pool (KHE 2006a). Downstream of White House Pool, stream power would drop measurably, enough to potentially decrease transport capacity of silt and fine sand, although the magnitude of these change would not be anticipated to appreciably alter channel geometry or bed-form conditions (KHE 2006a).

Tidal Power and Sediment Transport Patterns: Hydraulic modeling showed that tidal velocities (~6.6 ft/s) during an average tidal month would be sufficient in the hydrologically reconnected East Pasture Old Slough to erode or maintain created channels at least in the northern portion of the East Pasture through mobilization of sediment with bulk densities as high as compact sandy clay, including potentially sediment deposited during overbank flooding (KHE 2006a). Conversely, tidal velocities in the West Pasture may be much lower (~1.2 ft/s) than the East Pasture and below the threshold for mobilization of loose sandy clay material, although they would be higher than under baseline conditions (KHE 2006a). In Lagunitas Creek, tidal velocities would be almost identical to those under baseline conditions and Alternatives A and B, suggesting that there would not likely be any net changes in channel conditions (KHE 2006a).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this

alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative B would have similar minor to major beneficial effects on hydrologic processes as Alternative A. Under this alternative, both the West and East Pasture would be restored, although most of the new public access infrastructure and facilities, including a bridge, would be located along the perimeter of the East Pasture. Complete removal of the East Pasture levees and breaching of the West Pasture levees would result in moderate beneficial effect on the extent of tidal inundation. This alternative would have moderate beneficial effects on freshwater hydrologic processes in the Project Area through expanded removal and breaching of levees, removal of the Fish Hatchery Creek tidegate, and discontinuation or deconstruction of agricultural practices and infrastructure in both the West and East Pastures, although, from a watershed perspective, the beneficial effects would be relatively minor. There would be the potential for construction of small levees to protect lower-elevation properties on the east side of Sir Francis Drake Boulevard. As with Alternative A, some of the largest benefits would come from the major or substantial beneficial effects on floodplains and floodwater storage and sediment transport processes. Both the cumulative amount of floodwater and the amount of suspended sediment that moves through the Project Area floodplains would increase substantially under this alternative, potentially decreasing the amount of sediment that is delivered by Lagunitas Creek to southern Tomales Bay by up to 17.8 percent or 8,900 tons/day during 2-year events. Based on these results, the project would result in potentially moderate beneficial effects on sedimentation patterns in southern portion of Tomales Bay.

Alternative C

Analysis: Alternative C would have very similar impacts to Alternative B on water resources and hydrologic processes, with beneficial effects ranging from minor to major (Table 54). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. The southern perimeter trail would include construction of the pedestrian access bridge across Lagunitas Creek near the old summer dam, and a planning area for continuation of the southern perimeter trail to Inverness Park. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. A small tidal channel would be initiated off Lagunitas Creek, as well as in the interior of the East Pasture. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

As with the other alternatives, the tidegate/flashboard dam structure on what would become the former Tomasini Creek would not be removed, but would be left in place to maintain subtidal conditions during low tides for the federally endangered fish species, tidewater goby (*Eucyclogobius newberryi*). During high tides, there would still continue to be some muted tidal action in the shallowly flooded sparsely vegetated flats in eastern portion of the East Pasture from Tomasini Creek waters flowing through a culvert in the Tomasini Creek berm. As discussed under Alternative B, the increase in tidal influence would be expected to increase salinities within the freshwater marsh adjacent to Sir Francis Drake Boulevard, which supports breeding California red-legged frog (*Rana aurora draytonii*). This issue is discussed in more detail under Wildlife Resources. Circulation patterns and salinities in the West Pasture would continue to be strongly influenced by perennial freshwater flow from Fish Hatchery Creek and groundwater flow from the Inverness Ridge, as well as several other small drainages. As with Alternative B, this alternative would also eliminate the borrow ditch directly north of the West Pasture levee and reconnect the tidal slough in the undiked marsh with the remnant one in the West Pasture, which persists as a shallow, frequently flooded depressional feature.

Fluvial or Freshwater Processes: Alternative C would expand upon restoration actions in Alternative B and would, therefore, appear to have moderate rather than minor beneficial effects on fluvial or surface freshwater hydrologic processes in the Project Area. Under this alternative, the West Pasture levee would be completely removed, and portions of several small channels would be realigned to more natural channel patterns or morphology from the unnaturally straight alignment created by repeated ditching efforts. The major effects that this would have on Lagunitas Creek floodplains and floodplain capacity and fluvial sediment deposition on floodplains are analyzed and discussed separately below. As with Alternative B, a small berm would potentially be constructed to reduce flooding of lower-elevation private properties on the east side of Sir Francis Drake Boulevard: while this would reduce fluvial influences of Lagunitas Creek on this property, it could potentially at least temporarily increase inundation or flooding of the property from surface flow and run-off from the Inverness Ridge.

Approximately two-thirds of the downstream portion of Tomasini Creek in the Giacomini Ranch would be removed from its leveed channel and realigned into one of its historic channel alignments, the East Pasture Old Slough. This slough would be realigned to mimic more natural tidal marsh channel patterns, as it was ditched for storage of irrigation water some time after the 1940s. This would potentially affect localized channel morphology, fluvial sediment transport and delivery, channel avulsion and meandering, and floodplains and influence hydraulic characteristics such as flow velocity and the erosive power of flood flows. The existing Tomasini Creek channel would remain as a backwater slough, with a low berm or levee placed between it and the new channel to allow some flood overflow from the new channel into the old one during flood events. Circulation patterns within would not be expected to change with disconnection of the semi-permanent freshwater flow of Tomasini Creek from its old channel, with generally well-mixed conditions continuing to exist, although salinities may increase. Groundwater inflow from the Point Reyes Mesa, however, would be expected to continue to moderate salinity concentrations of tidal waters from Tomales Bay during the summer and fall, when bay salinities increase to almost marine concentrations.

Excavation of hydrologic impediments and replacement of culverts on Levee and Bear Valley Roads in the Olema Marsh would dramatically improve hydraulic connectivity between upstream portions of Bear Valley, the marsh, and Lagunitas Creek through dramatically decreasing water levels, which appear to have been increasing generally in recent years, perhaps since the 1998 flood event. Prior to 1998, Bear Valley Creek drained from Olema Marsh through two culverts, with most of the channel flow apparently preferentially flowing to the westernmost one near White House Pool County Park (KHE 2006b). During the 1998 flood event, the main outflow for Bear Valley Creek in Olema Marsh, however, became the easternmost culvert, with huge amounts of sediment from Inverness Ridge debris flows apparently blocking the westernmost culvert. The easternmost culvert is not only smaller, but constructed at a higher elevation, which, combined with the loss of the westernmost one, has considerably reduced creek outflow from the marsh (KHE 2006b). In addition, past fill events have created a low sediment berm in the marsh near the easternmost culvert that acts almost as a funnel to creek flow, limiting the amount of water that can reach the culverts. The effect of these impediments can be seen in the fact that water levels in the marsh are consistently 4 feet above the culvert invert, and there is some evidence that water levels are continuing to rise, as only in the 1990s, one researcher described the water surface as being below the Bear Valley Road culverts, but these culverts are consistently submerged now (KHE 2006b). With a reduction in water levels in Olema Marsh, water surface levels within the Bear Valley Creek Marsh directly upstream of Bear Valley Road would be expected to decrease, as well, through improvements in hydraulic connectivity and drainage, although the degree of reduction is uncertain.

Under the adaptive restoration approach, the first step would be to remove the berm and to excavate a shallow, better defined flow path for Bear Valley in the currently vegetation-choked channel. The success of these initial restoration measures would be assessed over time, before a decision is made as to whether to proceed with replacement of one or both culverts. As discussed above, water surface levels could drop as much as 4 feet to the elevation of the culvert invert following removal of the berm and improvement in flow conditions (KHE 2006b). Replacement of the Levee Road culvert with a bridge installed at a lower elevation would potentially lower water surface levels another 1-2 feet (KHE 2006b). A decrease in water surface level would greatly improve hydraulic connectivity of the Bear Valley Creek system with Lagunitas Creek, which would have benefits for species such as salmon. The implications of this dramatic decrease in water surface levels for wildlife and other resources such as topography, soils, water quality, and vegetation are analyzed in other sections of this chapter.

As with Alternatives A and B, the only increase in infrastructure would come from installation of a prefabricated bridge near the old summer dam location across from White House Pool County Park, but the bridge would be designed to have no footings in the active channel or floodplain, thereby reducing effects on

hydrologic processes. Creation of a freshwater marsh in the East Pasture Tomasini Triangle would constrain sheet flow of surface run-off and groundwater emerging from the base of the Point Reyes Mesa through berms constructed to prolong ponding of waters for creation of breeding California red-legged frog habitat and minimize potential tidal intrusion during extreme high or storm tides. In addition, there may be some minor adverse affects during construction from temporary installation of coffer dams needed to dewater construction areas such as Fish Hatchery Creek, Tomasini Creek, and areas along the East Pasture creek bank sufficiently to complete construction, but these would be largely offset by the numerous benefits this alternative would have on hydrologic processes and functions. In fact, all of these actions would be expected to reduce constraints on surface freshwater hydrologic processes by almost 37 percent (Table 55). From a watershed perspective, the expanded amount and degree of restoration under this alternative would increase its benefits to watershed function and processes relative to the other alternatives from minor to moderate.

Tidal Prism: Complete removal of East and West Pasture levees would result in a moderate beneficial effect on the extent of area inundated twice daily by tides relative to baseline conditions, but would not increase tidally inundated acreage relative to Alternative B despite continuing to increase the extent of tidal channels in the East Pasture (189.1 acres in the East Pasture and 21.3 acres in the West Pasture; KHE 2006a; Table 55). However, areas inundated during daily tides within the Project Area would increase under Alternative C, because of restoration efforts in Olema Marsh, with acreage increasing from approximately 210 under Alternative B to 231 acres under Alternative C (Table 55). These areas represent elevations that would be flooded at MHW. However, topographic surveys show additional extensive acreage would be subject to tidal inundation at tidal levels between MHW and MHHW. Over the long-term, however, sea level rise could cause an increase in the potential extent of area inundated by tides, particularly in the East Pasture. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100. This rate sea level rise could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88.

In Olema Marsh, excavation of the berm and a more defined creek flow path would result in improved drainage through the marsh, and reduction of static marsh water level as described above. Dewatering and potential subsequent subsidence of peat soils would considerably expand the meager amount of existing tidal influence into the marsh, increasing the extent of area affected by daily tidal action up to 20 acres with a tidal prism ranging from 21 to 32 acre-feet depending on the adaptive restoration components implemented (KHE 2006a).

Floodplain/Floodwater Retention: Under this alternative, both the West and East Pastures would continue to be flooded more frequently by Lagunitas Creek during smaller (1.5- to 2-year) flood events just as in Alternative B (KHE 2006a). However, under Alternative C, Tomasini Creek flood flows would now be routed through the East Pasture, as well. Under Alternative C, cumulative floodwater volume modeled for the 2-year flood event relative would climb approximately 6 percent from 1,873 acre-feet under Alternative B to 2,050 acre-feet (KHE 2006a; Table 55). As water spills onto the floodplain, cumulative floodwater volume in Lagunitas Creek would drop from approximately 9,972 acre-feet under existing conditions to 8,000 acre-feet under Alternative C (KHE 2006a; Table 55). This reduction would represent a decrease of 20 percent relative to baseline conditions, but only 1 percent relative to Alternative B, and may support that most of the increase in cumulative floodwater volume under this alternative comes from Tomasini Creek. Cumulative floodwater volume during a 100-year event would increase only negligibly to approximately 39,200 acre-feet between Alternatives B and C, but would still represent more than 100 percent increase from baseline conditions (KHE 2006a). Under this alternative, inundated area in the East Pasture would remain roughly similar to that under Alternatives A and B (~300 acres) under the 2-year flood event, increasing from 1.8 acres under baseline conditions (KHE 2006a). During a 50-year event, the entire 350-acre East Pasture would be flooded (KHE 2006a). Floodwaters would be expected to move through the East Pasture more rapidly with removal of levees, concrete spillway, and undersized or poorly functioning tidegates, which may account for the dramatic increase in cumulative floodwater volume during the 100-year event relative to baseline or existing conditions.

Under Alternative C, complete removal of the levee would result in a minor increase in the extent of inundated area in the West Pasture under the 2-year event, with acreage increasing from 70 to 83 acres (KHE 2006a). Under Alternative C, cumulative floodwater volume under the 2-year event increases dramatically from approximately 4 acre-feet under baseline conditions and 5 acre-feet under Alternative B to 50 acre-feet under Alternative C. For the 100-year event, cumulative floodwater volume would climb from 610 acre-feet under existing conditions to approximately 5,000 acre-feet under Alternative C, a 5 percent increase over Alternative B (KHE 2006a). As discussed under Alternative B, the discrepancy between pastures in total inundation (50-

year versus 500-year flood event) is reflected in the much lower cumulative floodwater volume in the West Pasture, even under fully restored conditions.

For Olema Marsh, this alternative would act to decrease floodwater retention – or at least persistent impoundment – and increase transport of floodwaters from the Bear Valley Creek system. For this reason, inundated area under the 2- to 500-year flood events would change negligibly, if at all (KHE 2006a). Inundated volume would drop from approximately 202 acre-feet under baseline conditions to 185 acre-feet under Alternative C, with the degree of reduction fairly consistent among all flood events up to the 500-year flood (KHE 2006a). This decrease in inundated volume during flood events is reflected in slightly lower maximum floodwater elevations within the marsh, which drop from approximately 11.2 to 10.7 feet NAVD88 under a 2-year event (KHE 2006a).

Stream Power and Sediment Transport Patterns: The potential movement of sediment onto floodplains in the East Pasture would increase even more under Alternative C with removal of not only the Lagunitas Creek levees, but realignment of Tomasini Creek into the East Pasture. Based on the sediment rating curve developed by H. Esmaili & Associates (1980), approximately 50,000 tons/day of suspended sediment would potentially move through the portion of Lagunitas Creek in the Project Area during a 2-year flood event. Under Alternative C, the percentage of suspended sediment from Lagunitas Creek potentially moving through the East and West Pastures would increase from 10 percent or approximately 5,020 tons/day under Alternative A to 19.8 percent or approximately 9,900 tons/day under Alternative C, with only a slight increase (< 1 percent) relative to Alternative B. Based on flood flow volume, almost 98 percent of this sediment (~ 9,650 tons/day) would move through or end up in the East Pasture rather than the West Pasture.

Based on hydraulic modeling, stream power in the East Pasture under a 2-year flood event would be almost identical to that under Alternative B, with transport capacity lost relatively quickly on the floodplains (KHE 2006a). The sudden loss in stream power would suggest that trapping efficiency, at least under smaller flows, would be high and could result in approximately 9,400 tons/day of sediment being deposited on the Giacomini Ranch floodplains under Alternative C (Table 55). Increased rates of floodplain deposition could have a moderate beneficial effect on the Bay by reducing sediment and potentially pollutant delivery by as much 18.8 percent, compared to 17.8 percent (~8,900 tons/day) under Alternative B (Table 55).

The primary difference for the East Pasture would continue to be restored conditions versus baseline ones, which are affected by the presence of levees, spillways, culverts, and other infrastructure that limit outflow capacity and decrease velocities. In the West Pasture under Alternative C, there would be a general increase in stream power, relative to both baseline conditions and Alternative B with the complete removal of the levees, tidegates, and spillway (KHE 2006a). Stream power would drop sharply once waters crest the creek bank, causing most of the fines to be deposited close to Lagunitas Creek (KHE 2006a). Stream power would remain extremely low throughout Olema Marsh during both baseline and restored conditions, although transport capacity increases considerably near the Levee Road culvert outlet (KHE 2006a). While removal of the levees and increased off-channel storage of flood flows might be expected to decrease stream power in Lagunitas Creek channel and increase deposition or aggradation of sediment in this reach, hydraulic modeling suggests that, during 2-year flood events the creek would continue to maintain transport capacity at least in the reach upstream of White House Pool (KHE 2006a). Similar to Alternative B, stream power would drop measurably downstream of White House Pool, enough to potentially decrease transport capacity of silt and fine sand, although the magnitude of these change would not be anticipated to appreciably alter channel geometry or bed-form conditions (KHE 2006a).

Sediment deposition during floods can, over time, lead to net aggradation within floodplain areas and, ultimately, decrease trapping efficiency as vertical elevation of the floodplain rises. This trend tilts the evolutionary trajectory within wetland systems towards establishment of uplands, but within naturally dynamic systems such as estuaries, these trends are often counterbalanced by sea level rise (discussed above under Tidal Prism) and subsidence (either compaction- or fault-associated) that act to maintain or regenerate wetlands even within depositional environments.

Tidal Power and Sediment Transport Patterns: Similar to Alternative B, hydraulic modeling showed that tidal velocities (~6.6 ft/s) during an average tidal month would be sufficient in the hydrologically reconnected East Pasture Old Slough to erode or maintain created channels -- at least in the northern portion of the East Pasture -- through mobilization of sediment with bulk densities as high as compact sandy clay, including potentially sediment deposited during overbank flooding (KHE 2006a). In Olema Marsh, tidal velocities would increase considerably relative to baseline conditions, with velocities even higher than the East Pasture (~ 9 ft/s), although tidal influence would drop off sharply approximately 150 feet from Levee Road (KHE 2006a).

Tidal velocities in the West Pasture would continue to be much lower (~1.2 ft/s) than the East Pasture and below the threshold for mobilization of loose sandy clay material, although they would be higher than under baseline conditions (KHE 2006a). In Lagunitas Creek, tidal velocities would be almost identical to those under baseline conditions and Alternatives A and B, suggesting that there would not likely be any net changes in channel conditions (KHE 2006a).

With maintenance of existing tidal velocities in Lagunitas Creek, the influence of estuarine sediment transport processes such as gravitational circulation that involves resuspension of sediment along channel bottoms through strong tidal currents would likely remain negligible in the Project Area, because tidal currents do not have sufficient power to move the alluvial sands and gravels that comprise most of the streambed. However, tides and currents would continue to strongly influence circulation patterns within this reach of Lagunitas Creek such as gravitational circulation or density- or salinity-based stratification of waters that could at least create, particularly in areas where bathymetry changes abruptly such as shoals, zones where suspended sediment concentrations would reach a peak or maximum and preferentially fall out of suspension in the creek channel. While this could contribute to reductions in sediment delivery to Tomales Bay, the dominance of fluvial forces in this part of the estuary would suggest that fluvial sediment transport processes governing transport and deposition within in-stream and off-stream storage areas such as floodplains would largely dictate sediment delivery rates to the Bay, at least within the Project Area.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described for the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative C would have similar minor to major beneficial effects on hydrologic processes as Alternative B. Complete removal of the East and West Pasture levees and adaptive restoration of Olema Marsh would have a moderate beneficial effect on surface tidal and freshwater hydrologic processes, with effects on some processes and functions such as floodplains and floodplain capacity and fluvial sediment deposition on floodplains characterized as major beneficial effects. As with Alternative B, there would still be the potential for construction of a small levee to protect lower-elevation properties on the east side of Sir Francis Drake Boulevard.

Complete removal of East and West Pasture levees and adaptive restoration of Olema Marsh would result in a moderate beneficial effect on the extent of area inundated twice daily by tides relative to baseline conditions and an increase relative to Alternative B (KHE 2006a). These areas represent elevations that would be flooded at MHW, however, additional extensive acreage would be subject to tidal inundation at tidal levels between MHW and MHHW.

The expanded amount of restoration under this alternative increases its value to watershed restoration efforts.. As with Alternatives A and B, some of the largest benefits would come from the major or substantial beneficial effects on floodplains and floodwater storage and sediment transport processes. Alternative C would result in major beneficial impacts associated with increased floodplain function and floodwater retention. In addition, the amount of suspended sediment that moves through the Project Area floodplains would increase under this alternative, potentially decreasing the amount of sediment that is delivered by Lagunitas Creek to southern Tomales Bay by as much as 18.8 percent or 9,400 tons/day. As a result, Alternative C would have major beneficial impacts on sediment transport within the Project Area and potentially minor beneficial effects on sediment deposition within the southern end of Tomales Bay.

Alternative D

Analysis: Alternative D would have very similar impacts to Alternative C on water resources and hydrologic processes, with beneficial effects ranging from minor to major (Table 54). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all

of the differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to intertidal elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and further scaling back of new public access facilities through elimination of the bridge across Lagunitas Creek and one of the spur trails on the eastern perimeter. In addition, there would be excavation of even more new tidal channels in the East Pasture. Tomasini Creek would be realigned into one of its historic alignments just downstream of Mesa Road and would run through the constructed freshwater marsh area just north of the Giacomini Ranch dairy facility. There would be no change in restoration approach in the West Pasture from Alternative C, and the same adaptive management approach would be undertaken in Olema Marsh, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Fluvial or Freshwater Processes: Under this alternative, Tomasini Creek would be completely moved out of its leveed channel into one of its historic alignments just downstream of Mesa Road and would run through the newly created freshwater marsh in the Tomasini Triangle. Low berms would be used to ensure that the creek would not drain the marsh, which is being constructed as breeding habitat for California red-legged frog. Low berms would constrain to some degree the potential for channel avulsion or meandering, sediment deposition, and floodplain connectivity, although functionality would still be improved relative to existing leveed conditions. Replacement of the Tomasini Creek culverts at Mesa Road would increase hydraulic connectivity between upstream and downstream reaches and potentially decrease any backwater flooding effects from undersized infrastructure.

The existing Tomasini Creek channel would remain as a backwater slough, with a low berm placed between it and the new channel to allow some flood overflow from the new channel into the old one during flood events. Tidal action in the old Tomasini Creek channel would continue to be controlled by the tidegate/flashboard dam structure, maintaining subtidal conditions in the backwater slough, until such time that the marsh and marsh channels have developed to offer alternate habitat for the tidewater goby. As under Alternative C, circulation patterns within would not be expected to change with disconnection of the semi-permanent freshwater flow of Tomasini Creek from its old channel, with generally well-mixed conditions continuing to exist, although salinities may increase. Groundwater inflow from the Point Reyes Mesa, however, would be expected to continue to moderate salinity concentrations of tidal waters from Tomales Bay during the summer and fall, when bay salinities increase to almost marine concentrations.

Under Alternative D, there would be no installation or construction of infrastructure such as bridges or culverted trails that would impede hydrologic process. Creation of a freshwater marsh in the East Pasture Tomasini Triangle would constrain sheet flow of surface run-off and groundwater emerging from the base of the Point Reyes Mesa through berms constructed to prolong ponding of waters for creation of breeding California red-legged frog habitat and minimize potential tidal intrusion during extreme high or storm tides. There may be some minor adverse effects during construction from temporary installation of coffer dams needed to dewater construction areas such as Fish Hatchery Creek, Tomasini Creek, and areas along the East Pasture creek bank sufficiently to complete construction, but these would be largely offset by the numerous benefits this alternative would have on hydrologic processes and functions.

Tidal Prism: The only change in tidal hydrologic processes relative to Alternative C would come from the slightly expanded extent of area in the East Pasture inundated twice daily by tides, with acreage increasing from 189.1 acres under the other action alternatives to 195 acres under Alternative D. This increase in inundated area would come from lowering of the southwestern corner of the East Pasture to intertidal elevations. Areas inundated during daily tides within the Project Area would increase, then, under Alternative D from approximately 231 under Alternative C to 252 acres under Alternative D (Table 55). As with the other alternatives, a rise in sea level over the long-term could cause an increase in the potential extent of area inundated by tides, particularly in the East Pasture. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88.

Fluvial or Freshwater Processes: As with Alternative C, Alternative D would expand upon restoration actions in Alternative B and would, therefore, also appear to have moderate rather than minor beneficial effects on fluvial or surface freshwater hydrologic processes in the Project Area. Tomasini Creek would be fully realigned in one of its historic channels, and the Tomasini Creek Mesa Road culvert would be replaced. These actions would further reduce constraints on surface freshwater hydrologic processes by almost 44 percent, a 5

percent increase over Alternative C (Table 55). From a watershed perspective, the expanded amount and degree of restoration under this alternative would increase its benefits to watershed function and processes relative to the other alternatives from minor to moderate. The major effects that this would have on Lagunitas Creek floodplains and floodplain capacity and fluvial sediment deposition on floodplains are analyzed and discussed separately below.

Floodplain/Floodwater Retention: Under this alternative, both the West and East Pastures would continue to be flooded more frequently by Lagunitas Creek during smaller (1.5- to 2-year) flood events just as in Alternative C (KHE 2006a). However, under Alternative D, Tomasini Creek flood flows would now be routed through a larger portion of the East Pasture. Cumulative floodwater volume in the East Pasture during the 2-year and 100-year flood events would not differ appreciably from that under Alternative C, with volume estimated at 2,030 acre-feet during the 2-year event (KHE 2006a). Floodwater volume in the Project Area would climb slightly from 2,049 acre-feet under Alternative C to 2,079 acre-feet under Alternative D during a 2-year event, all of which results from an increase in flows from Tomasini Creek and storage volume in the East Pasture (KHE 2006a; Table 55). Cumulative floodwater volume in Lagunitas Creek during a 2-year event would be very similar to Alternative C, with volume dropping from approximately 8,000 acre-feet under Alternative C to approximately 7,975 acre-feet under Alternative D (KHE 2006a; Table 55). The reduction in cumulative floodwater volume during a 2-year event would represent roughly a 20 percent decrease relative to baseline conditions. As noted earlier, there would be no additional restoration in the West Pasture and Olema Marsh so flood frequency, cumulative floodwater volume, and inundated area would be as described under Alternative C.

Stream Power and Sediment Transport Patterns: Based on cumulative floodwater volume, the percentage of suspended sediment from Lagunitas Creek potentially moving through the East and West Pastures would account for 20 percent or approximately 9,830 tons/day, which would be double the sediment load transported under Alternative A (4,880 tons/day; KHE 2006a). Almost 98 percent of this sediment (~ 9,600 tons/day) would move preferentially into the East Pasture rather than the West Pasture. The sudden loss in stream power suggested by hydraulic modeling once floodwaters crest the levees would suggest that trapping efficiency, at least under smaller flows, would be high and could result in approximately 9,525 tons/day of sediment being deposited on the Giacomini Ranch floodplains under Alternative D compared to 9,400 tons/day under Alternative C (Table 55). Increased rates of floodplain deposition could have a moderate beneficial effect on the Bay by reducing sediment and potential pollutant delivery by as much as 19 percent, which is only slightly more than the 18.8 percent reduction that would be expected under Alternative C (Table 55).

Tidal Power and Sediment Transport Patterns: Tidal power conditions and estuarine sediment transport processes and patterns would be similar to those described in Alternative C.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative D would have similar minor to major beneficial effects on hydrologic processes as Alternative C. This alternative would expand restoration efforts by lowering more of the marshplain in the East Pasture to intertidal elevations, realigning almost the entire portion of Tomasini Creek within the Project Area into one of its historic alignments, and replacing the undersized culvert for Tomasini Creek at Mesa Road. These actions would have a moderate beneficial effect on surface tidal and freshwater hydrologic processes, with effects on some processes and functions such as floodplains and floodplain capacity and fluvial sediment deposition on floodplains characterized as major beneficial effects.

The only change in tidal hydrologic processes relative to Alternative C would come from the slightly expanded extent of area in the East Pasture inundated twice daily by tides, with acreage increasing from 189.1 acres under the other action alternatives to 195 acres under Alternative D. This increase in inundated area would

come from lowering of the southwestern corner of the East Pasture to intertidal elevations. As with Alternative C, the expanded amount of restoration under this alternative, which particularly focuses on restoration of Tomasini Creek, does increase its value to watershed restoration efforts, although the beneficial effects would still be relatively minor from an overall watershed perspective. As with the other action alternatives, some of the largest benefits would come from the major or substantial beneficial effects on floodplains and floodwater storage and sediment transport processes. Both the cumulative volume of floodwater and the amount of suspended sediment that moves through the Project Area floodplains would remain similar to that of Alternative C under this alternative, potentially decreasing the amount of sediment that is delivered by Lagunitas Creek to southern Tomales Bay by as much as 19 percent or 9,525 tons/day during 2-year flood events.

Water Resources –Water Quality

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

The Federal Water Pollution Control Act (Clean Water Act) and subsequent amendments of 1977 (33 USC §1251 et seq)provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters, primarily through three sections – Section 404, Section 401, and Section 303(d). Federal, state, and local agencies are required to comply with the Clean Water Act, and most have developed their own policies regarding activities affecting water quality. The Park Service Management Policies (2006) mandates parks to "take all necessary actions to maintain or restore the quality of surface waters and groundwaters consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations" (Section 4.6.3; NPS 2006). Additional information on other federal, state, and local policies can be found in Chapter 3 under Water Resources – Water Salinity and Water Quality.

In California, authority for Section 401 and Section 303 has been delegated to the State Water Resources Control Board (SWRCB), which also is responsible for overseeing California's water quality law, the Porter Cologne Act. The water quality control plan for the San Francisco Bay region, including the entire Marin coastline, is the Water Quality Control Plan for the San Francisco Bay Basin (RWQCB 1995a), The Basin Plan (RWQCB 1995a) designates beneficial uses of water for specific water bodies, establishes specific water quality objectives to protect those uses, and provides a program to implement the objectives. For Lagunitas Creek, beneficial uses include contact and non-contact recreation, oyster production, municipal and domestic water supply, agricultural supply, cold freshwater habitat, fish migration, preservation of rare and endangered species, recreation, fish, spawning, and wildlife habitat. Under Section 303(d) of the Clean Water Act, the state and the nine regional boards are able to declare certain water bodies as "impaired" or unable to perform designated beneficial uses by specified contaminants. Lagunitas Creek and Tomales Bay have been declared impaired under Section 303(d) for sediment, nutrients, and pathogens.

The ranges or thresholds used to characterize the quality of waters and need for cleanup measures come from the Basin Plan (RWQCB 1995a; Table 9 in Chapter 3 under Water Resources – Water Salinity and Water Quality). There are two types of objectives: narrative and numerical: Narrative objectives present general descriptions of water quality that must be attained and serve as the basis for the development of detailed numerical objectives (RWQCB 1995a). Numerical objectives typically describe pollutant concentrations, physical/chemical conditions of the water itself, and the toxicity of the water to aquatic organisms. Numerical water quality objectives in the Basin Plan build upon national water quality standards established by the U.S. Environmental Protection Agency (USEPA). Additional guidelines have been established for characterizing nutrient concentrations in natural, unpolluted waters of estuaries and freshwater streams by AWWA (1990).

General Assumptions and Methodologies:

- Water quality objectives for Tomales Bay are currently contained in the Basin Plan (RWQCB 1995a), which applies to all waters in the San Francisco Bay area Basin. Many of the objectives in the Basin Plan have components or sub-objectives that are very specific to the San Francisco Bay estuary or certain locations within the estuary. For these objectives, the most applicable sub-objective has been chosen for comparison with Project Area and Tomales Bay waters.
- Basin Plan water quality objectives cover at least 19 different water quality parameters, including bacteria, bioaccumulation, biostimulatory substances, color, dissolved oxygen, floating material, oil and grease, pH, radioactivity, salinity, sediment, settleable material, sulfide, suspended material, taste and odors,

temperature, toxicity, turbidity, and unionized ammonia. USEPA objectives include standards for nitrates and nitrites.

- The Tomales Bay watershed has been declared impaired by the RWQCB under Section 303(d) of the Clean Water Act for nutrients, sediment, pathogens, and mercury. Lagunitas Creek has been declared impaired for sediment, nutrients, and pathogens. The RWQCB has adopted criteria for the Pathogen TMDL, which identifies ambient water concentrations for fecal coliform in the watershed streams (200MPN/100ml[log mean]), at the Green Bridge (95 MPN/100ml[log mean]) and in Tomales Bay (14 MPN/100ml [median value]).
- The purpose of the proposed project is to restore natural hydrologic functions and processes, such as water quality improvement. One of the objectives of the project is to take a watershed-based approach to restoration such that restoration efforts maximize not only the opportunity to improve water quality within the Project Area, but within the entire Tomales Bay watershed.
- Changes in water quality conditions were not conducted as part of the hydrodynamic modeling, with the exception of salinity, but modeling results and other hydrologic information collected can be used to qualitatively predict changes in water quality conditions.
- Because changes in salinity conditions are generally considered a neutral effect and not an impact in and of itself, any evaluation of potential impacts related to changes in salinity in the Project Area will be assessed relative to specific impact topics (e.g., California red-legged frog under Wildlife Resources).
- Changes in functional capacity for the Project Area to intercept and filter pollutants in flood flows from upstream portions of the watershed are evaluated under Water Resources – Hydraulics and Hydrologic Resources, Hydrologic Functions – Floodplains.

Listed below are methodologies for significance criteria related to water quality, including specific assumptions or details on methodologies.

Changes in Water Quality Conditions – Project Area: Impact thresholds focus on change in overall water quality conditions in the Project Area, including changes in the number or frequency of exceedances of water quality objectives during, immediately after, and some time after construction (Table 56). Evaluation of exceedances of Basin Plan or USEPA water quality objectives focuses on potential changes in the number of objectives that are violated on a regular or consistent basis in the East Pasture, West Pasture, Lagunitas Creek, Tomasini Creek, and Olema Marsh.

Exceedance is determined based on recorded values from Park Service or other data exceed Basin Plan or USEPA objectives. Objectives are defined as being infrequently (≤ 25 percent of values), occasionally (≤ 50 percent of values), regularly (≤ 75 values), or consistently (>75 percent) exceeded (see Table 9 in Chapter 3 under Water Resources – Water Salinity and Water Quality). This impact indicator specifically focuses on changes in water quality conditions that result from the proposed project.

For certain nutrients, there are either no objectives or very high ones aimed specifically at human health concerns. For example, for nitrates, USEPA objectives for human health are high enough (>10 mg/L) that measurable change would also be masked. There are no Basin Plan or USEPA objectives for dissolved phosphates or ammonia, except for toxic forms of nitrogen such as unionized ammonia and nitrites. The RWQCB, however, is proposing to develop a TMDL for nutrients, which can, in excess, cause ecological impacts, in addition to being harmful to human health. Nutrients that do not have objectives such as ammonia and phosphates are also analyzed in this section.

Potential changes are semi-quantitatively evaluated using an understanding of current water quality conditions; sources of current water quality problems (e.g., dairy, septic, non-point source surface run-off, and physical factors such as long water residence time, etc.); expected changes in loading with implementation of the proposed project; rate of decline in various pollutants with time; and the potential for future loading of pollutants with overbank flooding during storms and tidal flushing. In addition, the number of exceedances or overall ambient concentrations of water quality parameters within other Tomales Bay reference wetlands was also used in analysis.

TABLE 56. WATER QUALITY – PROJECT AREA

Source: RWQCB Basin Plan, Park Service Management Policies, Marin CWP, Community Plan **Nature**: Beneficial, Adverse **Context**: Project Area **Duration**: Construction, Short-Term, Long-Term

TABLE 56. WATER QUALITY – PROJECT AREA

No Impact	There would be no potential for impact to water quality associated with the proposed project.
Negligible	***Beneficial***: The proposed project would result in a negligible or barely detectable improvement in water quality conditions such that the frequency of exceedance of Basin Plan and USEPA objectives in the Project Area would decrease slightly (≤ 10 percent) relative to existing conditions. ***Adverse***: The proposed project would result in a negligible or barely detectable deterioration in water quality conditions such that the frequency of exceedance of Basin Plan and USEPA objectives in the Project Area would increase slightly (≤ 10 percent) relative to existing conditions.
Minor	***Beneficial***: The proposed project would result in a minor improvement in the water quality conditions such that the frequency of exceedance of Basin Plan and USEPA objectives in the Project Area would decrease measurably (> 10 and ≤25 percent) relative to existing conditions. ***Adverse***: The proposed project would result in a minor deterioration in water quality conditions such that the frequency of exceedance of Basin Plan and USEPA objectives in the Project Area would increase measurably (> 10 and ≤25 percent) relative to existing conditions.
Moderate	***Beneficial***: The proposed project would result in a moderate improvement in water quality conditions such that the frequency of exceedance of Basin Plan and USEPA objectives in the Project Area would decrease appreciably (> 25 and ≤50 percent) relative to existing conditions. ***Adverse***: The proposed project would result in a moderate deterioration in water quality conditions such that the frequency of exceedance of Basin Plan and USEPA objectives in the Project Area would increase appreciably (> 25 and ≤50) relative to existing conditions.
Major or Substantial	***Beneficial***: The proposed project would result in a major improvement in water quality conditions such that the frequency of exceedance of Basin Plan objectives in the Project Area would decrease strikingly (>50 percent) relative to existing conditions. ***Adverse***: The proposed project would result in a major deterioration in water quality conditions such that the frequency of exceedance of Basin Plan objectives in the Project Area would increase appreciably (> 50 percent) relative to existing conditions.

Changes in Water Quality Conditions in Watershed: This impact indicator focuses on potential change in water quality conditions in the southern portion of the Tomales Bay watershed with construction or implementation of the proposed project. Changes in water quality downstream of the Project Area would result from changes in the quality of water flowing out of Project Area and changes in the functional capability of the Project Area to receive waters from upstream portions of the watershed and to filter and store or transform sediment, nutrients, and contaminants from these waters. This impact indicator does not attempt to assess whether water quality objectives or guidelines would be met through potential implementation, although these are used as a guide, along with conditions in natural wetlands, to assess which changes might be beneficial or adverse. This analysis represents a semi-quantitative estimation of changes expected under the various alternatives based on extensive baseline data, hydraulic modeling results, and professional judgment regarding the effect of any changes on water quality (Table 57). This analysis takes into account several pieces of information, including: 1) cumulative volume of floodwaters during a 2-year flood event as estimated through hydraulic modeling of the various alternatives; and 2) estimated loading rate of nutrients, pathogens, and sediment during flood events based on RWQCB pathogen study (RWQCB 2001) and literature-derived estimates of nutrient retention, uptake, and transformation (Kadlec and Knight 1996). Daily sediment yields and sediment deposition rates (tons/day) on floodplains as evaluated under Sediment Transport Processes under Water Resources – Hydrologic Processes.

TABLE 57. WATER QUALITY - WATERSHED

Source: RWQCB Basin Plan, Park Service Management Policies, Marin CWP, Community Plan **Nature**: Beneficial, Adverse **Context**: Project Area **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no potential for impact to water quality downstream of the Project Area associated with the proposed project.
Negligible	A barely detectable change in water quality conditions would be expected downstream of the Project Area based on changes in conditions in Project Area waters and functional capacity. Changes would be in the range of natural variability for conditions in natural wetlands in Tomales Bay and surrounding watersheds.
Minor	A measurable change would be expected downstream of the Project Area based on changes in conditions in

TABLE 57. WATER QUALITY - WATERSHED

	Project Area waters and functional capacity. Change would be expected to exceed the range of natural variability by ≤ 10 percent. If adverse change occurs, water quality conditions would not exceed Basin Plan objectives.
Moderate	An apparent and measurable change would be expected downstream of the Project Area based on changes in conditions in Project Area waters and functional capacity. Change would exceed the range of natural variability by ≤ 20 percent. If an adverse change occurs, water quality conditions might exceed Basin Plan objectives.
Major or Substantial	A substantial and major change would be expected downstream of the Project Area based on changes in conditions in Project Area waters and functional capacity. Change would exceed the range of natural variability by > 20 percent. If an adverse change occurs, water quality conditions would probably exceed Basin Plan objectives.

Impact Analysis

TABLE 58. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR WATER RESOURCES – WATER QUALITY
All impacts would be considered Project Area and are separately analyzed for Construction and Short-Term/Long-Term.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Project Area Water Quality					
Construction	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible
Short-Term	Beneficial - Negligible	Beneficial – Minor	Beneficial - Minor	Beneficial - Negligible	Beneficial - Negligible
Long-Term	Beneficial - Minor	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Major	Beneficial - Major
Watershed Water Quality					
Construction	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible
Short-Term	Beneficial- Negligible	Beneficial- Negligible	Beneficial- Negligible	Beneficial- Minor	Beneficial- Minor
Long-Term	Beneficial- Negligible	Beneficial - Minor	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Moderate

No Action Alternative

Analysis: The No Action Alternative would generally have negligible to minor effects on water quality in the Project Area and the southern portion of the Tomales Bay watershed (Table 58). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The remainder of the levees in the East Pasture and West Pasture would remain, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities. There would be no public access facilities.

Project Area-Overview: The No Action Alternative would have minor beneficial effects on water quality in the Project Area and negligible beneficial effects in the watershed, largely because of the elimination of intensive agricultural management practices. In Olema Marsh, where there is no agricultural use, conditions would be expected to remain fairly similar to baseline conditions.

Under the existing purchase agreement with the Giacomini Trust, the Giacomini Ranch dairy had a 7-year Reservation of Use agreement that allowed the Giacomini family to continue dairying until the agreement expires in spring 2007. At that time, the dairy will close, and agricultural management practices associated with dairying will cease. These management practices include crossing of Lagunitas Creek by Giacomini Ranch dairy cows; infrequent discharge of waters in East Pasture ditch system to Lagunitas Creek; periodic maintenance of levees and creek crossings; frequent dredging of ditches creeks for improved water conveyance and pasture drainage; and shallow and concentrated spreading of manure.

Under the No Action Alternative, there is a potential for leased grazing of dairy heifers or beef cattle on the

Giacomini Ranch lands in the future, which would be in accordance with the parks' GMP. Leasing would undergo a separate environmental review process, but it is likely that, if lease or leases were approved, that the Seashore would institute restrictions on resource setbacks or setbacks from creeks and certain wetland areas, as well as the intensity, duration, and timing of grazing. In addition, certain creeks in the West Pasture would continue to be dredged to eliminate flood risks to adjacent private residences.

Agricultural management practices have dramatically affected water quality conditions in the Project Area, particularly the East Pasture. Within the Project Area, monitoring has shown occasional, regular, or consistent exceedance of Basin Plan or USEPA objectives for fecal coliforms, unionized ammonia, nitrates, nitrites, dissolved oxygen, and pH. Water quality conditions within the Project Area are generally not eutrophic, but there are occasionally spikes in nutrients and toxic nutrients, and concentrations of pathogen indicators such as fecal coliform are consistently high. Certain ditches within the Giacomini Ranch have extremely poor water quality, with oxygen levels at levels low (<< 5 mg/L) enough to cause mortality to aquatic organisms. General mechanisms for delivery of pollutants from the Project Area to the Bay include the cattle crossing areas, pumping of ditches, and general outflow through leaky tide gate facilities.

Water quality conditions are generally most limited in the pasture ditches, which have been constructed to maintain drainage and groundwater level. Elimination of frequent ditching would decrease the production of organic matter whose breakdown generates the chronically low or almost non-existent levels of oxygen within waters of East Pasture ditches that causes consistent exceedance of Basin Plan dissolved oxygen objectives. Decomposition of organic matter may also be responsible for the occasional exceedances of oxygen objectives in the vegetation-choked, peat-rich substrates of Olema Marsh. As with natural wetlands, oxygen levels would be expected to infrequently drop into hypoxic (low) conditions during summer nights when warm temperatures during the day boosts phytoplankton and algal productivity within shallower water features, causing spikes in oxygen demand or respiration at night that temporarily reduces available oxygen. These periods of high productivity are often accompanied by sharp elevations in pH greater than 8.5 that would continue to cause infrequent exceedance of Basin Plan pH objectives. In addition, some of groundwater-fed drainages would probably continue as they do now to show slightly lower pH that infrequently dips below 6.5. In keeping with Basin Plan project-related objectives, this alternative would not be expected to cause change greater than 0.5 pH in any of the hydrologic units within the Project Area.

Project Area -Nutrients: With elimination of intensive dairying, infrequent pulses of nitrates, nitrites, and unionized ammonia in the East Pasture that exceed Basin Plan and USEPA objective would be eliminated or practically eliminated. The East Pasture had at least six instances where nitrates exceeded USEPA objectives of 10 mg/L, well above the ambient concentrations of most natural systems, even if slightly eutrophic (Parsons, *in prep*.). There were also five instances in the East Pasture where nitrites exceeded objectives for aquatic life of 0.5 mg/L, and at least one where nitrites exceeded USEPA objectives of 1 mg/L. The substantial reduction in nutrient source loading with elimination or reduction in grazing intensity, along with discontinuation of manure spreading practices, would be expected to eliminate exceedances of these objectives. Low oxygen levels in ditches caused by oxygen demand generated by frequent ditching and generation of decomposing organic matter probably played a role in infrequent exceedance of nitrite and unionized ammonia objectives (Parsons, *in prep*.). Extremely low levels or the absence of oxygen in waters can prohibit the conversion of nitrites to nitrates, allowing this typically very transient form of nitrogen to persist and potentially cause negative impacts on aquatic organisms. Increases in dissolved oxygen within East Pasture waters would be expected to practically eliminate, if not totally eliminate, violation of nitrite objectives. Even in reference or natural marshes, nitrites are occasionally detected due to temporary hypoxia, probably during the summer when large diel variations in oxygen production and demand play havoc with oxygen levels (Parsons, *in prep*.).

Low oxygen also affects the conversion of ammonia to nitrites, with low oxygen conditions favoring ammonia. While ammonia occurred at dramatically lower concentrations in the Project Area relative to nitrates and was often undetectable, the East Pasture had among the highest ammonia concentrations, which is undoubtedly due to the hypoxia prevalent in most of the ditches and ditched former sloughs (Parsons, *in prep*.). Under warm temperatures and high pH, ammonia converts to another toxic nutrient form, unionized ammonia. The East Pasture had one instance when unionized ammonia concentrations exceeded Basin Plan maximum objectives of 0.16 mg/L and four instances when concentrations exceeded the median objective of 0.025 mg/L (Parsons, *in prep*.). In addition, the downstream-most sampling location on Lagunitas Creek also had very high unionized ammonia concentrations on one occasion, which appeared to be related to the very infrequent episodes of pumping of East Pasture ditch waters into the creek (Parsons, *in prep*.). Based on nutrient concentrations and patterns in natural or undiked wetlands in Tomales Bay, these episodes would be

eliminated under the No Action Alternative through increased conversion of ammonia to nitrates through considerable increases in oxygen concentrations and a decrease in overall nutrient loading.

Discontinuation of intensive agricultural management practices would not eliminate all sources of nutrient loading to the Project Area. Even with levees largely disconnecting the Giacomini Ranch from Lagunitas Creek and Tomasini Creek, the West Pasture would continue to have influxes of nitrates from Inverness Ridge drainages such as Fish Hatchery Creek, which flow underneath Sir Francis Drake Boulevard and into the West Pasture. Fish Hatchery Creek is the largest tributary in the West Pasture and is not leveed, so it, therefore, frequently floods overbank into the pasture. A slightly smaller drainage, the 1906 creek, runs through one of the private properties before it flows into the extensive freshwater marsh in the northern portion of the West Pasture adjacent to Sir Francis Drake Boulevard. This marsh also receives hydrologic inputs from groundwater emerging at the base of the Inverness Ridge, as well at least one other small drainage. Nitrate concentrations in creeks regularly (> 50 percent) exceed 1 mg/L, the upper threshold established by the AWWA (1990) for moderate aquatic organism diversity and avoidance of algal blooms in estuaries. Maximum nitrate concentrations in these creeks reached as high as 6.7 mg/L (Parsons, *in prep*.). Nitrate concentrations in groundwater-fed areas infrequently (> 25 percent) exceed 1 mg/L, with concentrations ranging as high as 2.4 mg/L (Parsons, *in prep*.). Similar conditions exist in Olema Marsh, where nitrate concentrations regularly exceed 1 mg/L in portions of Bear Valley Creek directly upstream of the marsh (Parsons, *in prep*.). Because of levees and/or tidegates/culverts, most of the waters flowing into the Project Area are either retained entirely or, in the case of the West Pasture and Tomasini Creek, have longer residence times due to inefficient conveyance of waters through culverts.

While loading or total volume of nutrients flowing into the Project Area remains relatively low compared to larger creeks such as Lagunitas, these sources still represent the primary hydrologic contribution to the West Pasture, except during larger storms such as 12-year flood events when Lagunitas Creek flows are sufficient to crest the West Pasture levees and flow onto the currently diked floodplain. Even under grazed conditions and seemingly higher-than-normal nutrient loading from agricultural sources, nitrate concentrations and loading consistently decreased on Fish Hatchery Creek downstream of the sampling location located at the Project Area boundary, suggesting that nitrates were being retained either in the channel during lower flows or on the floodplain during higher flows. Nitrate concentrations decreased by an average of 1.0 mg/L, with the median reduction 0.75 mg/L (Parsons, *in prep*.). A similar trend was observed in Olema Marsh at upstream and downstream portions where Bear Valley Creek flowed into and out of the marsh. Nitrate concentrations decreased, on average, by 0.85 mg/L between the upstream and downstream portions of the marsh (Parsons, *in prep*.).

Research on other systems has shown that, while ammonia and total nitrogen have fairly high retention rates (~21 – 76 %) in a variety of aquatic systems from treatment wetlands to floodplains (Behrendt 1996; Kadlec and Knight 1996; De Witt 1999; Seitzinger et al. 2002; van der Lee et al. 2004), nitrates often have fairly low retention rates, at least on active floodplains and floodplain terraces, because they remain in solution rather than bound or sorbed to sediment particles as do other nutrients such as ammonium, organic nitrogen, and phosphates and therefore tend not to get "trapped" (van der Lee et al. 2004). Flattening of the Fish Hatchery Creek stream gradient as it flows into the West Pasture may decrease downstream velocities and increase the potential for nitrates to be assimilated by aquatic plants or phytoplankton in the stream channel or converted from nitrates to nitrogen gas. With removal or reductions in number of cattle, the efficiency of in-stream and possibly floodplain wetlands in decreasing the relatively small, but key, loading of nitrates from upstream sources should improve slightly under the No Action Alternative, but concentrations would probably still occasionally exceed 1 mg/L.

Under the No Action Alternative, the East Pasture remains largely hydrologically disconnected from any fluvial inputs from Lagunitas and Tomasini Creeks, with the exception of the 11-acre restored area in the northern portion described above. Primary hydrologic sources for the East Pasture, therefore, are limited to direct precipitation, surface run-off, emergent groundwater from the base of the Point Reyes Mesa terrace, non-point surface run-off from the town of Point Reyes Station, and irrigation waters during the summer. While cattle would still represent a source of nutrient loading, the intensity of grazing and management would decrease appreciably. Nutrients such as ammonium, nitrates, and phosphates, all of which are high under baseline conditions relative to other hydrologic units within the Project Area, would be affected less by continued influx of new nutrients in most of the East Pasture and more by the rate at which moderate to excessively high nutrients in waters and soils could be expected to decrease over time without active removal of "hot soils" or hydrologically reconnecting ditches and sloughs to flush them out. Certain portions of the East Pasture perimeter, however, would continue to receive influxes of nutrients from non-point source run-off from the

town of Point Reyes Station and septic-influenced groundwater. Nutrient loads would be expected to decrease in at least one of the run-off sources on the north end of Point Reyes Station that currently receives run-off from one of the Giacomini Ranch feedlots.

Few studies appeared to have addressed the issue of the timeframe over which nutrients and constituents of agriculturally managed soils and water such as fecal coliform decrease in response to removal or reduction in intensity of agriculture. In general, nutrients within the water column would be expected to transition relatively quickly into other nutrient forms or to be uptaken by plants and phytoplankton. However, flux out of soils into overlying waters could lengthen the timeframe over which nutrient concentrations would decrease within the East Pasture waters. Certain nutrients such as phosphates become soluble in soils and available for flushing into overlying waters when conditions become anaerobic or low in oxygen, which typically occurs during periods of persistent or repeated flooding or ponding. Other constituents such as metals are tightly bound under the reduced, slightly acidic to neutral pH conditions characteristic of flooded wetland soils.

With the exception of the drainage ditches and ditched sloughs, most of the East Pasture is only surface flooded temporarily or seasonally, although soil saturation in response to rainfall or receding surface often persists until early June (Parsons, *in prep*.). Some of these areas are subsequently flooded or spray irrigated in the summer. There are a few areas along the eastern perimeter of the East Pasture where soil saturation persists permanently or semi-permanently due to the emergence of groundwater flows. Through most of the pasture, soils would remain oxidized for a large portion of the year, which would encourage rapid breakdown of organic matter into oxidized inorganic nutrients such as nitrates and either subsequent assimilation of these nutrients by plants or conversion into nitrogen gas. Under oxidized conditions, the pool of undecomposed organic matter and inorganic nutrients is typically low, because it is expended quickly, as is evident from the comparatively low of organic matter in upland versus wetland soils. Within the East Pasture, it is likely most of these nutrients would be "lost" through plant uptake, with the moderately to excessively high nutrient load favoring establishment of weedy species that proliferate quickly under high nutrient conditions. This issue is discussed in more detail under the Vegetation Resources section of this chapter.

Project Area-Pathogens: Perhaps, the most pervasive issue or problem under baseline conditions is fecal coliform, which has been traditionally used an indicator of pathogen or bacterial contamination levels. Fecal coliform concentrations in all hydrologic units of the Project Area, including Olema Marsh, consistently (>75 percent) to regularly (> 50 percent) exceed TMDL objectives for Lagunitas Creek of 200 MPN/100 ml , as well as the 95 MPN/100 ml load-based allocation for Lagunitas Creek at the Green Bridge (established in 2005). Within the East Pasture, fecal coliform concentrations regularly surpass the 2,000 MPN/100 ml Non-Contact Recreational use threshold. As with nutrients, removal or reductions in the number of cattle would substantially decrease coliform loading. However, results of some limited testing in the Project Area for surfactants that are commonly incorporated into detergents would suggest that leaking septic systems, as well as cattle, may contribute to coliform or pathogen loading to the Project Area. Fluvial or creek water draining non-agricultural subwatersheds such as the Inverness Ridge, as well as groundwater from the Inverness Ridge and Point Reyes Mesa and non-point source run-off from Point Reyes Station, regularly to consistently exceed TMDL objectives for Lagunitas Creek of 200 MPN/100 ml. Another potential source is wildlife. Unlike nitrates, which decreased at the downstream end of Olema Marsh, fecal coliform generally increases from upstream to downstream, suggesting some localized contribution. These sources could include wildlife such as waterfowl that commonly use the marsh or leaking septic systems, as Olema Marsh also receives hydrologic inputs from small drainages and emergent groundwater off the Inverness Ridge. These sources would be expected to continue to influence the Project Area under the No Action (and other) Alternatives.

Unlike nutrients, which are typically rapidly assimilated or converted, bacteria can persist for an extended period of time in both water and soils. In one study, *E. coli* -- another bacteria that has become more popular as a pathogen indicator -- lived in lake waters for at least 6 to 7 days, but in nutrient-rich river water, *E. coli* survived in excess of 3 weeks and was believed to persist for as long as 2 months in sediment (Palmateer and Huber 1985; Huron County Science Committee 2005). Under these conditions, coliform concentrations would be expected to slowly decrease particularly in the East Pasture, although pathogens would not be eliminated due to the potential retention of at least limited grazing and septic-influenced hydrologic inputs. Over the long-term, the East Pasture would be expected to have lower coliform levels than the West Pasture due to the fact that it would still be leveed off from Lagunitas and Tomasini Creeks, which would have much higher loading rates than the seeps and non-point source run-off that currently drains into the pasture. While leveed off from Lagunitas Creek, the West Pasture would be more highly influenced by Fish Hatchery Creek and the other drainages, which have higher loading rates.

Pollutant Retention and Effects on Tomales Bay: Under flood flow conditions, nutrient- and pathogen-laden waters would flow into both the East and West Pastures. The East Pasture would flood during a relatively small to moderate-sized flood events (3.5 year – 7 year), while the West Pasture levee would require considerably more flow to overtop (12 year; KHE 2006a). Floodwaters would overtop levees and spill onto the floodplain, dropping a considerable amount of suspended sediment near the levees with the abrupt drop in stream power (KHE 2006a). These sediments are often associated with nutrients such as ammonium, organic nitrogen, and phosphate; pathogen indicators such as fecal coliform and *E. coli*; and contaminants such as metals. Research on rivers in Europe, where nitrates are the predominant form of nitrogen, has shown that nitrate retention on floodplains is extremely low, because it is not associated with sediment and tends to remain free in solution (van der Lee et al. 2004). While sediment and nutrient loading often show a linear relationship with streamflow or discharge, deposition of sediment and sediment-associated nutrients, pathogens, and contaminants onto floodplains appear to display more of a non-linear relationship in which at some specific threshold of flow velocities become high enough that most of the sediments, nutrients, pathogens, and contaminants are transported through floodplains rather than retained. In a study on Missouri creeks, Heimann (2001) found that more suspended sediment deposition occurred under smaller floods such as 5-year events than larger ones such as 25-year events, because flood flow velocities on the floodplain were lower.

The optimal flow at which trapping efficiency of the Giacomini Ranch floodplains is maximized is unknown. While nutrient and pathogen loading rates for a 3.5-year flood event – the smallest flood event capable of overtopping the Giacomini Ranch levees -- cannot be estimated from existing data, instantaneous loading on the falling limb (~5,000 cfs) of a 2.25-year flood event in 2006 was estimated at approximately 10 million MPN per second for fecal coliform in Lagunitas Creek at the Green Bridge, the upstream boundary of the Project Area (Parsons, *in prep*.). Calculated instantaneous loading rates during this same storm event totaled approximately 220 mg/s for nitrates, while those for phosphates totaled approximately 40 mg/s (Parsons, *in prep*.). Even with levees, then, some floodplain deposition of sediment, nutrients, pathogens, and contaminants would occur, but the frequency of these overbank flooding events would be substantially lower, because higher water levels would be required to initiate floodplain flooding, particularly in the West Pasture (~12-year flood event). At some probably much higher flow, increased velocities might begin to preclude deposition even if floodplains are flooded.

Because Lagunitas Creek would occasionally overflow into the Giacomini Ranch pastures, this alternative would be expected to have, over the long-term, at least a negligible beneficial effect on water quality downstream of the Project Area in southern Tomales Bay. Currently, overbank flooding during larger storm events may increase loading to the watershed due to the excessive amount of nutrients, pathogens, and manure present, at least in the East Pasture. A similar effect would potentially be expected over the short-term during larger storm events, with floodwaters moving through the Project Area and causing discharge of nutrient- and pathogen-laden waters to downstream areas of Lagunitas Creek. Relative to the other alternatives, it would longer under the No Action Alternative for the existing loads of nutrients and pathogens, particularly in the East Pasture, to dissipate to levels characteristic of other lightly grazed and/or open space areas. However, with a reduction or elimination of grazing and elimination of intensive agricultural management practices, overbank flooding would be expected over the long-term to contribute positively to the watershed by filtering sediment, nutrients, pathogens, and contaminants, which is one of the more functions that wetlands play. The degree that water quality conditions in the bay would be improved is tempered to some degree by the relative infrequency that the Giacomini Ranch would flood. There would be little interaction between Tomasini Creek and the East Pasture.

Possible Additional Mitigation Measures: No additional mitigation measures are proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There are at least four (4) currently proposed projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented, the Bear Valley Creek Watershed Enhancement Project, Chicken Ranch Beach Enhancement, the East Shore Wastewater Improvement Project, and the County of Marin's Culvert Cleaning Project, generally described in Table 25 of this chapter. The Bear Valley Creek Project proposes to replace failing or underperforming hydrologic infrastructure at a number of locations on Bear Valley Creek within the Seashore boundaries. There is no definitive timeframe for construction of this project, but preliminary design for this project would be expected to have a cumulatively beneficial effect through improvement of hydrologic and ecological processes and

functions in the upper portions of the Bear Valley Creek subwatershed, upstream of Olema Marsh. This project would have negligible effect to minor effects on water quality for the Bear Valley subwatershed and Project Area. The East Shore Wastewater Improvement Project would construct a community wastewater system to replace substandard and marginally operating septic systems for 91 properties along the east shore of southern Tomales Bay. Another creek and wetland restoration project is proposed for Chicken Ranch Beach, a small drainage on the western shore of Tomales Bay that consistently has high pathogen loading to the bay. The Tomales Bay Watershed Council is working with local agencies to identify and reduce sources of loading and restore the lower floodplain area, which has been negatively impacted by fill. The County of Marin Department of Public Works is proposing to clean out culverts on the northern edge of Olema Marsh in one of its former outlets that now serves primarily to convey Silver Hills Creek flows. This proposed project could cumulative contribute to increases in turbidity in adjacent waters such as Lagunitas Creek depending on the construction schedule, however, any cumulative effect would be expected to be no more than minor. Cumulatively, the proposed project, in combination with these other projects, would be expected to have a minor to perhaps even moderate beneficial effect on water quality within southern Tomales Bay.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The No Action alternative would generally result in generally negligible to minor effects on water quality in the Project and the southern portion of the Tomales Bay watershed. The only changes under this alternative would be a small 11-acre wetland restoration component that is required under the Park Service's existing mitigation agreement with CalTrans, reduction in intensity or elimination of grazing, and the discontinuation of agricultural management practices that have had negative effects on water quality. Nutrient and pathogen loading in water would decrease slowly, because of the possible interaction between soil and water that could continue to introduce nutrients and pathogens into overlying waters. Direct loading of nutrients and pathogens associated with the active dairy operations would end, and generally improve water quality conditions within the Project Area. Source loading of nutrients and pathogens from other sources such as creeks and drainage and emergent groundwater potentially affected by leaking septic systems, non-point source run-off from the town of Point Reyes Station, and wildlife use of marsh areas could remain. In addition, there is potential under the No Action Alternative for leased grazing of dairy heifers or beef cattle through a separate environmental review process, although grazing would be expected to be lower in intensity and regulated more tightly in terms of minimizing resource impacts. During larger flood events ranging from 3.5- to 12-year flood events, floodwaters from Lagunitas Creek would reach levels high enough to overtop levees and flow onto floodplains, where sediment-associated nutrients, pathogens, and contaminants would probably be retained depending on velocity of waters. Over the short-term, loading to Lagunitas Creek during storm events where overbank flooding occurs may increase through floodwaters moving through the Project Area and causing discharge of the still nutrient- and pathogen-laden waters to downstream areas of Lagunitas Creek. However, over the long-term, overbank flooding onto floodplains would be expected to decrease nutrient and coliform loading to southern portions of the Tomales Bay watershed. While this would improve conditions in the bay, the effect would probably be relatively minor, with the frequency of flooding being relatively low (3.5- to 12-year events). Also, with Tomasini Creek still leveed off from the East Pasture, there would be little chance for reduction of loads from this source.

Alternative A

Analysis: Alternative A would generally have negligible to moderate effects on water quality in the Project Area and the southern portion of the Tomales Bay watershed. Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. The southern perimeter trail includes a bridge crossing of Lagunitas Creek near the old summer dam, and evaluation of a planning corridor in the West Pasture between White House Pool and Inverness Park. There would be no restoration in the Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

Project Area-Overview: During the short- and long-term, Alternative A would have minor to moderate beneficial effects on water quality in the Project Area and negligible to minor beneficial effects in the watershed, because of the elimination of intensive agricultural management practices. Discontinuation of agricultural operations and removal of dairy infrastructure, roads and ditches would reduce potential for exceedance of Basin Plan and USEPA water quality objectives from actions within the Project Area. In general, the breaching of levees in the East Pasture will increase the frequency of flooding into the area. One role this area will play in the watershed water quality condition is to expand potential areas for deposition and detention of pollutants. Under Alternative A, there is no potential for leased grazing, thereby eliminating another potential source of nutrients and pathogens to the Project Area and further reducing nutrient loading. Also, a 13-acre area in the East Pasture where manure has been heavily spread would be excavated, and the nutrient-laden soils would be used to fill in the manure ponds on the dairy mesa, which would eliminate another potential source of residual nutrients and possibly pathogens from the East Pasture.

Alternative A would involve removal of the one-way tidegate on the East Pasture Old Slough, but a berm blocking drainage of slough waters would also be removed. This would increase hydrologic connectivity with Lagunitas Creek. Road and ditch infrastructure in the East Pasture will be removed. Creation of tidal channels will convey tidal water into and through parts of the East Pasture, and minimizing stagnant conditions that can lead to poor water quality in terms of low oxygen in waters and high nutrients and even toxic nutrients. Some increase in ponding and water residence time would be expected along the eastern perimeter trail, where construction of a berm trail would likely cause ponding of surface run-off and emergent groundwater despite inclusion of culverts to improve conveyance. Impacts during construction would be characterized as negligible adverse, because BMPs would be instituted to reduce potential impacts associated with incidental fallback of sediment into the creek.

Project Area-Nutrients and Pathogens: Within the Project Area, removal of direct pollutant sources from the Project Area, and improved hydraulic connectivity through the Project Area would be expected to have a more dramatic effect on reduction in nutrients, including nitrates, and pathogen indicators such as fecal coliform than the No Action Alternative. Over the long-term, the East Pasture would still be expected to only occasionally (>25 percent and <50 percent) exceed AWWA nitrate objectives of 1 mg/L, however, unlike under baseline conditions, this would occur when nitrates rather than ammonia would be the prevalent form of nitrogen. In addition, additional efforts to remove sources of contamination would increase effects on coliform concentrations, which would be expected to only occasionally exceed TMDL objectives for Lagunitas Creek of 200 MPN/100 ml. In Olema Marsh, where there is no agricultural use, conditions would be expected to remain fairly similar to baseline conditions.

As discussed under the No Action Alternative, discontinuation of intensive agricultural management practices would not eliminate all sources of nutrient loading to the Project Area. Even with levees largely disconnecting the Giacomini Ranch from Lagunitas Creek and Tomasini Creek, the West Pasture would continue to have influxes of nitrates and pathogens from Inverness Ridge drainages such as Fish Hatchery Creek and the 1906 drainage and possible groundwater emerging from the base of the Inverness Ridge and flowing into the West Pasture. Under Alternative A, several breaches would be created in the East Pasture, which would increase hydrologic connectivity between Lagunitas Creek and its floodplain. In addition, the East Pasture would also be influenced by emergent groundwater from the base of the Point Reyes Mesa terrace and non-point surface run-off from the town of Point Reyes Station, both of which appear to have moderate- to high pathogen and nutrient loads.

Nitrate concentrations in creeks and groundwater-fed areas in the Giacomini Ranch and Olema Marsh regularly (> 50 percent) to infrequently (>25 percent) exceed 1 mg/L, the upper threshold established by the AWWA (1990) for moderate aquatic organism diversity and avoidance of algal blooms in estuaries. Fecal coliform concentrations in all hydrologic units of the Project Area, including Olema Marsh, consistently (>75 percent) to regularly (> 50 percent) exceed TMDL objectives for Lagunitas Creek of 200 MPN/100 ml, as well as the 96 MPN/100 ml load-based allocation for Lagunitas Creek at the Green Bridge.

Pollutant Retention and Effects on Tomales Bay: In the East Pasture, breaching of levees would increase the frequency of overbank flooding from 3.5- to 7-year events to 1.5- to 2-year events, thereby increasing the influence of Lagunitas Creek on the East Pasture and vice versa. During these storm events, floodwaters would overtop levees and spill onto the floodplain, dropping a considerable amount of suspended sediment near the levees with the abrupt drop in stream power. Relative to the No Action Alternative or baseline conditions, stream power appeared slightly higher, but still probably not strong enough to convey sediments more than a short distance from the creek banks (KHE 2006a). In addition to being a water quality pollutant

in and of itself – Tomales Bay has been declared impaired for sediment – suspended sediments are often associated with nutrients such as ammonium, organic nitrogen, and phosphate; pathogen indicators such as fecal coliform and *E. coli*; and contaminants such as metals.

The optimal flow at which trapping efficiency of the Giacomini Ranch floodplains is maximized is unknown. However, some estimates of potential instantaneous loading rates during smaller flood events can be derived from instantaneous loading rates calculated on the falling limb (~5,000 cfs) of a 2.25-year flood event in 2006. Because samples were collected in Lagunitas Creek at the Green Bridge, which is at the upstream boundary of the Project Area, these numbers do not include additional loading that would have occurred during this same event from Olema or Bear Valley Creeks, which are located downstream of the Green Bridge. During a storm event of this magnitude, approximately 50,000 tons/day of suspended sediment would be conveyed in Lagunitas Creek. Calculated instantaneous loading rates during this flood event totaled approximately 10 million MPN per second (MPN/s) for fecal coliform, 220 milligrams per second (mg/s) for nitrates, and 40 mg/s for total dissolved phosphates (Parsons, *in prep*.).

For the 2.25-year flood event, approximately 10 percent of Lagunitas Creek flood flows would be diverted into the East Pasture through overbank flooding. Through floodplain retention, suspended sediment loads within Lagunitas Creek could be reduced as much as 9.5 percent or approximately 4,770 tons/day. There are no definitive numbers for the percentage of pathogens likely to be retained on floodplains, but, as with sediments, estimates for coliforms generally appear to be high, with natural wetlands receiving untreated or partially treated municipal or stormwater discharges having a 94.2 to 99.9 percent removal rate, even with abundant use by wildlife (CH2MHill 1991 *in* Kadlec and Knight 1996). Retention efficiency generally exceeds 90 percent coliforms when influx concentrations are high (Kadlec and Knight 1996). During this storm, flows of approximately 5,000 cfs were sustained for at least one hour. Using an estimate of 90 percent retention on Giacomini Ranch floodplains (Kadlec and Knight 1996), instantaneous coliform loading rates in Lagunitas Creek could be reduced by as much as 8.6 percent or 860,000 MPN/s or 51.5 million MPN during just that one hour of flooding (Parsons, *in prep*.). In addition, using an estimate of 20 percent retention (Kadlec and Knight 1996), instantaneous phosphate loading rates in Lagunitas Creek could be reduced as much as 1.9 percent or 0.76 mg/s or 46 mg during just that one hour of flooding (Parsons, *in prep*.). Under this alternative, there would continue to be no overbank flooding into the West Pasture during a flood event of this size, so the East Pasture would continue to account for most of the pollutant reduction.

During the flood event described above, calculated instantaneous loading rates totaled approximately 220 mg/s for nitrates (Parsons, *in prep*.). However, nitrates may not be as readily retained by floodplains. Rather being sorbed to suspended sediment as are coliforms and phosphates, nitrates remain soluble and have, on some larger river systems, been found to have very low rates of retention (2 – 3%) on floodplains unlike other forms of nitrogen such as organic nitrogen and ammonia (van der Lee et al. 2004). The proportion of nitrogen removed from through a network of streams in an East Coast watershed ranged from 37 – 76 percent, but these numbers included ammonia and organic nitrogen (Seitzinger et al. 2002). Sampling has not been conducted on Lagunitas Creek for organic nitrogen, but ammonia is almost always below detection limit, as it is for almost all of the Project Area except for the East Pasture, suggesting that waters are generally well-oxidized, thereby converting ammonia to nitrates, and that the largest sources of these nutrients comes from some distance away. Ammonia often occurs in areas that are proximate to large sources of manure from livestock or fecal matter from wildlife, while nitrates are commonly associated with the influence of agricultural and residential fertilizers, septic systems, landfill leachate, commercial or industrial wastewater, and acid rain. Assuming a trapping efficiency rate of approximately 3 percent, the instantaneous loading rate of nitrate onto floodplains during the 2006 flood event would equate to roughly a 0.3 percent reduction in nitrate loads in Lagunitas Creek or a decrease of approximately 0.63 mg/s or a total of approximately 38 mg during that one hour of flooding.

Some nitrate retention does appear to occur with Project Area streams and associated wetlands. Even under grazed conditions and seemingly higher-than-normal nutrient loading from agricultural sources, nitrate concentrations and loading consistently decreased on Fish Hatchery Creek downstream of the sampling location at the Project Area boundary, suggesting that nitrates were being retained either in the channel during lower flows or on the floodplain during higher flows. Nitrate concentrations decreased by an average of 1.0 mg/L, with the median reduction 0.75 mg/L (Parsons, *in prep*.). A similar trend was observed in Olema Marsh at upstream and downstream portions where Bear Valley Creek flowed into and out of the marsh. Nitrate concentrations decreased, on average, by 0.85 mg/L between the upstream and downstream portions of the marsh (Parsons, *in prep*.). The average percent reduction was almost identical between these two systems – approximately 37 percent. The flat gradients present in both of these systems may increase residence time sufficiently to promote assimilation of nitrates by aquatic plants or phytoplankton in the stream

channel or conversion from nitrates to nitrogen gas through denitrification. Conversely, in Tomasini Creek, during approximately 50 percent of the sampling events, nitrate concentrations were higher downstream than upstream, and during 75 percent of the events, fecal coliform concentrations were also dramatically higher – on average, 544 percent -- downstream. These results point to a source of nitrates and coliforms being downstream of Mesa Road within the Project Area boundary. Dairy cattle rarely, if ever, cross over the levee to graze on the small fringing floodplain, so the source is believed to be leaking septic systems and other influences from residential development originating from either the worker housing or homes on the Point Reyes Mesa. Movement of these nutrients and pathogen indicators into the Project Area is enhanced by the existing seasonal to almost year-round groundwater and permeable gravel layers within this coastal marine terrace.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be identical to those described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Active restoration efforts under Alternative A, combined with discontinuation of intensive agricultural management and grazing throughout the Giacomini Ranch, would increase the benefits of this alternative on water quality in the Project Area relative to the No Action Alternative. Alternative A would be expected to have moderate beneficial effects over the long-term on water quality in both the East and West Pastures, however, there would be no to very negligible improvement in water quality conditions in Tomasini Creek. Increased overbank flooding in the East Pasture (reduced from 3.5 to 1.5 year flooding frequency) would increase floodplain detention and capture of many Bay pollutants. On floodplains, nutrients would be assimilated or uptaken by plants, converted to nitrogen gas, or would remain, as would most contaminants such as metals, within the sediment bound with varying degrees of strength to clays, silts, organic matter, and mineral complexes such as pyrite. Pathogens could persist in soils, but exposure to ultraviolet light can dramatically reduce pathogen levels (Palmateer et al. 1989).

As explained under the No Action Alternative, short-term effects would be less dramatic than long-term ones, because of the time expected to be required to bring water (and soil) conditions within the range characteristic of natural wetlands and grasslands. In addition, flooding of the East Pasture during storms may result in pulses of sediment, nutrients, and pathogens to downstream waters of Lagunitas Creek after construction is completed. These pulses would be expected to be transient in nature and not last more than 2- to 3 years. For this reason, short-term beneficial effects would be characterized as minor within the Project Area and negligible on a watershed scale. Negligible adverse effects may also occur during construction from temporary installation of coffer dams and accidental fallback of sediment into waters from excavation of levees along Lagunitas Creek. However, Best Management Practice (BMPs) would be instituted to minimize the effects of these actions on water quality within and downstream of the Project Area.

A much greater frequency of flooding by Lagunitas Creek of the East Pasture would be expected to have, over the long-term, a minor beneficial effect on water quality downstream of the Project Area in southern Tomales Bay. With elimination of grazing and elimination of intensive agricultural management practices, overbank flooding would be expected to contribute positively to the water quality of the southern portion of Tomales Bay by filtering sediment, nutrients, pathogens, and contaminants, which is one of the more functions that wetlands play. The extent to which this alternative could improve water quality conditions of the bay is restricted by the continued presence of levees, tidegates, and culverts in the West Pasture, Tomasini Creek, and Olema Marsh, as well as the continued influx of high loads of nutrients and pathogens from small creeks, drainages, and emergent groundwater into the Project Area. However, over the long-term, overbank flooding onto floodplains would be expected to have at least a minor beneficial effect on water quality within the southern portion of Tomales Bay by decreasing [of sediment, coliform, phosphate, and certain forms of nitrogen, with reductions in suspended sediment and instantaneous coliform loading estimated to be as high as 9.5 percent and 8.6 percent, respectively, during approximately 2-year flood events.

Alternative B

Analysis: As with Alternative A, Alternative B would generally have negligible to moderate effects on water quality in the Project Area and the southern portion of the Tomales Bay watershed (Table 58) Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture. The southern perimeter trail includes a bridge crossing of Lagunitas Creek near the old summer dam, and evaluation of a planning corridor in the West Pasture between White House Pool and Inverness Park. In addition, a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. The southern East Pasture creek bank would be restored through removal of rip-rap bank stabilization and regraded, where needed, to a more stabile profile. Lowering of levees between the East Pasture and Tomasini Creek would allow overflow during flood events, but otherwise Tomasini Creek would remain in its current channel with tidegate/flashboard dam structure still in place. As with Alternative A, this alternative would involve removal of agricultural infrastructure and discontinuation of agricultural management practices.

Project Area-Overview: Alternative B would have very similar beneficial effects to Alternative A on water quality in the Project Area and watershed relating to the removal of agricultural infrastructure and features (e.g., manure disposal area) in the East Pasture and elimination of intensive agricultural management practices in both pasture. Infrastructure removal and elimination of agricultural management practices would reduce potential for water quality and exceedance of water quality objectives are discussed in detail under the No Action Alternative and Alternative A. However, under Alternative B, the West Pasture levee would be breached, and the tidegate and concrete spillway would be removed, which would increase hydrologic connectivity with Lagunitas Creek and downstream areas with the West Pasture. Breaches of levees in the West Pasture would increase turnover of waters and minimize stagnant conditions that can lead to poor water quality in terms of low oxygen in waters and high nutrients and even toxic nutrients. In addition, the eastern perimeter trail would be constructed as a boardwalk rather than as a culverted berm trail, which would decrease ponding of surface run-off and emergent groundwater flowing off the Point Reyes Mesa. Conversely, creation of a freshwater marsh in the Tomasini Triangle would increase considerably residence time of some surface waters and emergent groundwater within at least 5.4 acres of the East Pasture, however, sustained inundation through at least the summer is necessary to create conditions conducive to supporting breeding and rearing of California red-legged frog (*Rana aurora draytonii*), a federally threatened species.

Project Area-Nutrients and Pathogens: This alternative would be expected to have a greater reduction of nutrients, including nitrates, and pathogen indicators such as fecal coliform than Alternative A. The change is less dramatic under this alternative perhaps because the West Pasture was not as intensely managed from an agricultural perspective as the East Pasture and already had limited exchange of waters with downstream areas. Over the long-term, the East and West Pastures would be expected to continue to have occasional (>25 percent and <50 percent) exceedances of AWWA (1990) nitrate objectives of 1 mg/L. This is the frequency at which this objective has been exceeded during the past four years of monitoring some of the natural, undiked wetlands in Tomales Bay, including Walker Creek marsh, which is exposed – as would be the Project Area – to high nutrient and pathogen loading from creeks, drainages, and other sources (Parsons, *in prep*.). Even Limantour Marsh, which is not subject to some of the same negative influences from dairying or other forms of agriculture and leaking septic systems, infrequently exceeds the AWWA (1990) upper threshold on nitrates for maintaining non-eutrophic conditions within estuaries (Parsons, *in prep*.). Ultimately, the degree of change that can be effected in the Project Area in terms of water quality improvement will be constrained by conditions with source creeks and other hydrologic sources. Data collected by the Park Service on water quality within reference wetlands in the watershed suggests that, for many of the objectives such as pH, dissolved oxygen, turbidity, and pathogens regulated under the Basin Plan (RWQCB 1995a), the range of natural variability is large and approaches or – in the case of pathogens – exceeds the numerical thresholds or limits imposed by water quality objectives (Parsons, *in prep*.).

Given these constraints, the degree of change effected under Alternative B relative to Alternative A is also much less dramatic for pathogens. As discussed under the No Action Alternative and Alternative A, "natural" water quality conditions within source creeks such as Lagunitas, Bear Valley, Fish Hatchery, Tomasini, and other drainages upstream of the Project Area or groundwater emerging at the base of the Inverness Ridge and Point Reyes Mesa often already exceeds TMDL and Basin Plan objectives. This is particularly true for the Lagunitas Creek TMDL concentration objective of 200 MPN/100 ml, which is regularly (>50 percent) to consistently (>75 percent) exceeded during single time sampling events within hydrologic sources to the

Project Area at sampling locations that are upstream or at the perimeter of the Giacomini Ranch and Olema Marsh. The TMDL objective technically applies to a geometric mean for a series of samples collected within 30 days, while water quality monitoring was conducted quarterly during different seasons, as well as during storm events, to define ambient conditions. However, the geometric mean for all the samples collected in four years also exceeded the Lagunitas Creek TMDL objective.

Under this alternative and Alternative A, coliform loads in the East Pasture would drop from consistently exceeding the TMDL objective for Lagunitas Creek to perhaps only occasionally exceeding this objective. Within the West Pasture, coliform loads would decrease, but would still be expected to regularly exceed the TMDL objective. As with nitrates, the larger degree of improvement projected for the East Pasture relative to the West Pasture relates primarily to the relative influence of continued loading from creeks, groundwater, and other hydrologic sources. Waters within the West Pasture would continue to be affected by seasonal to year-round -- if relatively low in terms of overall loading rate -- influx of coliforms from Fish Hatchery Creek, the 1906 drainage, other small drainages, and groundwater from the Inverness Ridge. Tomasini Creek would remain isolated in its leveed channel that is hydrologically disconnected from the East Pasture would not effect conditions in the East Pasture. Most of the hydrologic sources to the East Pasture either have very low loading rates despite almost year-round flow or are high loading (Lagunitas Creek), but only flood the East Pasture, on average, every 2 years. However, retention of this levee would also prevent the East Pasture from improving water quality of Tomasini Creek before these waters are discharged to Tomales Bay.

Pollutant Retention and Effects on Tomales Bay: Some of the other major changes under Alternative B relative to Alternative A relate to the frequency of overbank flooding from Lagunitas Creek and the volume of Lagunitas Creek floodwater that could be diverted onto Giacomini Ranch floodplains. Breaching of the West Pasture levee would increase the frequency of overbank flooding from 12-year events to 2-year events, thereby increasing the influence of Lagunitas Creek on the West Pasture.
While levees would be completely removed on the East Pasture, the frequency of overbank flooding from Lagunitas Creek into the East Pasture would still be identical to that under Alternative A, ranging from 1.5- to 2-year flood events. However, the volume of floodwaters conveyed through the East Pasture would increase and thereby potentially increase the benefits of this alternative to water quality. Based on hydraulic modeling, cumulative floodwater volume from Lagunitas Creek conveyed into the East Pasture during a 2-year event would climb from approximately 10 percent under Alternative A to approximately 18.8 percent under Alternative B (KHE 2006a). The East Pasture accounts for more than 99 percent of the reduction in cumulative floodwater volume in Lagunitas Creek under a 2-year event (KHE 2006a).

During these storm events, floodwaters would overtop creek banks or remaining levees and spill onto the floodplain, dropping a considerable amount of suspended sediment near the creek bank or levees because of an abrupt drop in stream power (KHE 2006a). Little difference existed between Alternatives A and B in terms of reduction in stream power and likelihood for the East Pasture floodplain to be depositional in nature, however, relative to the No Action Alternative or baseline conditions, stream power appeared slightly higher, but still probably not strong enough to convey sediments more than a short distance from the creek banks (KHE 2006a). In addition to being a water quality pollutant, suspended sediments are often associated with nutrients such as ammonium, organic nitrogen, and phosphate; pathogen indicators such as fecal coliform and *E. coli*; and contaminants such as metals.

The optimal flow at which trapping efficiency of the Giacomini Ranch floodplains is maximized is unknown. However, some estimates of potential instantaneous loading rates during smaller flood events can be derived from instantaneous loading rates calculated on the falling limb (~5,000 cfs) of a 2.25-year flood event in 2006 are described under Alternative A. During 2-year flood events, estimated suspended sediment loads in Lagunitas Creek could be reduced by as much as 17.8 percent, with approximately 9,340 tons/day deposited on East Pasture floodplains and another 23.1 tons/day deposited on West Pasture floodplains, Using an estimate of 90 percent retention for coliforms on East Pasture floodplains, instantaneous coliform loading in Lagunitas Creek could be reduced at rate as high as 16 percent or 1.6 million MPN per second during this portion of the storm event. During this storm, flows of approximately 5,000 cfs were sustained for at least one hour at the time of sampling. If overbank flooding could have occurred, coliform loading in Lagunitas Creek could have been reduced by 96 million MPN during just this one hour. In addition, using an estimate of 20 percent retention (Kadlec and Knight 1996), instantaneous phosphate loading rates in Lagunitas Creek could be reduced as much as 3.6 percent or 1.4 mg/s or 85 mg during just that one hour of flooding (Parsons, *in prep*.). As noted earlier, most of the cumulative floodwater volume from overbank flooding of Lagunitas Creek would flow into the East Pasture. Under this alternative, much less than 1 percent of the cumulative floodwater volume would end up in the West Pasture (KHE 2006a).

During the flood event described above, calculated instantaneous loading rates totaled approximately 220 mg/s for nitrates (Parsons, *in prep*.). However, nitrates may not be as readily retained by floodplains. Assuming a trapping efficiency rate of approximately 3 percent, the instantaneous loading rate of nitrate in Lagunitas Creek during an approximately 2-year event would be reduced by 0.5 percent relative to 0.3 percent under Alternative A due to increased retention on floodplains in the East Pasture, resulting in a total reduction in instantaneous nitrate loading rates of 1.2 mg/s or 70 mg during a one-hour period. Contributions from overbank flooding of the West Pasture would be extremely negligible (<<< 0.1 mg/s) under this alternative.

As discussed under the No Action Alternative and Alternative A, some nitrate retention does appear to occur with Project Area streams and associated wetlands. The flat gradients present in the West Pasture and Olema Marsh may increase residence time sufficiently to promote assimilation of nitrates by aquatic plants or phytoplankton in the stream channel or conversion from nitrates to nitrogen gas through denitrification. Conversely, in Tomasini Creek, during approximately 50 percent of the sampling events, nitrate concentrations were higher downstream than upstream, and during 75 percent of the events, fecal coliform concentrations were also dramatically higher – on average, 544 percent -- downstream. This pattern in the data points to a localized source of nitrates and coliforms, downstream of Mesa Road. Under Alternative B, some of the relatively minor loading of nutrients and coliforms from non-point source run-off from the town of Point Reyes Station and emergent groundwater on the East Pasture perimeter just north of the dairy facility may be ameliorated by the proposed construction of a freshwater marsh (Tomasini Triangle freshwater marsh) to offset expected losses of the freshwater marsh in the West Pasture adjacent to Sir Francis Drake Boulevard from increased salinity intrusion.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be identical to those described under the No Action Alternative.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: As with Alternative A, Alternative B would have much greater benefits to water quality in the Project Area than the No Action Alternative. Alternative B would be expected to have moderate beneficial effects on water quality in both the East and West Pastures, however, there would continue to be no to very negligible improvement in water quality conditions in Tomasini Creek. Increased overbank flooding from Lagunitas Creek would not be expected to reduce Project Area water quality, because most of these nutrients, pathogens, and contaminants would be deposited along with suspended sediment on the floodplains and not necessarily in Project Area waters and would be assimilated, converted, or remain bound to sediments. As explained under the No Action Alternative, short-term effects would be less dramatic than long-term ones, because of the time expected to be required to bring water (and soil) conditions within the range characteristic of natural wetlands and grasslands. In addition, flooding of the East Pasture during storms may result in pulses of sediment, nutrients, and pathogens to downstream waters of Lagunitas Creek after construction is completed. These pulses would be expected to be transient in nature and not last more than 2- to 3 years. For this reason, short-term beneficial effects would be characterized as minor as opposed to major. Negligible adverse effects may also occur during construction from temporary installation of coffer dams and accidental fallback of sediment into waters from excavation of levees along Lagunitas Creek. However, Best Management Practice (BMPs) would be instituted to minimize the effects of these actions on water quality within and downstream of the Project Area.

From a Lagunitas Creek perspective, the combination of the increased frequency of overbank flooding -- which occurs under Alternative A, as well – and the much greater cumulative floodwater volume routed through the East and West Pastures under Alternative B would increases the potential water quality benefits of this alternative to the watershed relative to Alternative A. Alternative B would be expected to have at least a minor beneficial effect on water quality downstream of the Project Area in southern Tomales Bay. With elimination of grazing and elimination of intensive agricultural management practices, overbank flooding

would be expected to contribute positively to the water quality of the southern portion of Tomales Bay by filtering sediment, nutrients, pathogens, and contaminants, which is one of the more functions that wetlands play. Over the long-term, overbank flooding onto floodplains would be expected to have at least a minor beneficial effect on water quality within the southern portion of Tomales Bay by decreasing loading of sediment, coliform, phosphate, and certain forms of nitrogen, with reductions in suspended sediment and instantaneous coliform loading estimated to be as high as 17.8 percent and 16 percent, respectively, during approximately 2-year flood events.

Alternative C

Analysis: Alternative C would have negligible to major effects on water quality in the Project Area and the southern portion of the Tomales Bay watershed (Table 58). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. The southern perimeter trail includes a bridge crossing of Lagunitas Creek near the old summer dam, and evaluation of a planning corridor in the West Pasture between White House Pool and Inverness Park. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. A small tidal channel would be initiated off Lagunitas Creek, as well as in the interior of the East Pasture. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Project Area-Overview: Alternative C would have very similar beneficial effects to the other alternatives on water quality in the Giacomini Ranch portion of the Project Area. The numerous effects that infrastructure removal and elimination of agricultural management practices would have on water quality and exceedance of water quality objectives are discussed in detail under the No Action Alternative and Alternative A. The effects of most of the restoration efforts, which include partial or complete removal of levees, tidegates, and culverts and excavation of new tidal channels, are fully discussed under Alternative B. As with Alternative B, this alternative would be expected to have a minor to moderate effect on reducing frequency of exceedances of Basin Plan objectives for dissolved oxygen, nitrates, nitrites, unionized ammonia, and fecal coliform. Ultimately, the degree of change that can be effected in the Project Area in terms of water quality improvement will be constrained by conditions with source creeks and other hydrologic sources. Data collected by the Park Service on water quality within reference wetlands in the watershed suggests that, for many of the objectives such as pH, dissolved oxygen, turbidity, and pathogens regulated under the Basin Plan (RWQCB 1995a), the range of natural variability is large and approaches or – in the case of pathogens – exceeds the numerical thresholds or limits imposed by water quality objectives (Parsons, *in prep*.). New activities associated with the Tomasini Creek and Olema Marsh areas would result in potential impacts to water quality conditions.

Project Area-Tomasini Creek: Currently, Tomasini Creek is leveed to run along the edge of the Point Reyes Mesa until its outlet with Lagunitas Creek and southern Tomales Bay near Railroad Point. The creek has only a very narrow fringing floodplain on the inboard of the levee, with flooding from overtopping or breaching of levees into the East Pasture much less common than with Lagunitas Creek. Under this alternative, Tomasini Creek would be reconnected to its historic floodplains, with size of this new floodplain in the East Pasture estimated at 64 acres. The existing channel and the tidegate/flashboard dam structure that regulates low flows in Tomasini Creek would be retained, because the creek supports a federally endangered fish species. However, it would become more of a backwater slough that would only receive flood flows from Tomasini Creek during large storm events. Otherwise, this backwater slough would continue to be almost fully tidal, with the malfunctioning tidegate/flashboard dam structure only truncating low flows, and salinities would continue to be dampened by the persistent groundwater flow from the Point Reyes Mesa, thereby maintaining brackish conditions.

Rerouting of Tomasini Creek would have beneficial effects on not only water quality within the creek, but within the southern portion of Tomales Bay. Tomasini Creek was one of the few areas in which nitrate and pathogen loads were higher downstream in the Project Area than upstream of the Project Area. During approximately 50 percent of the water quality sampling events between 2002 and 2006, nitrate concentrations were higher downstream than upstream, and during 75 percent of the events, fecal coliform

concentrations were also dramatically higher – on average, 544 percent – downstream (Parsons, *in prep*.). These results point to a source of nitrates and coliforms being downstream of Mesa Road within the Project Area boundary. Dairy cattle rarely, if ever, cross over the levee to graze on the small fringing floodplain, so the source is believed to be leaking septic systems and other influences from residential development originating from either the worker housing or homes on the Point Reyes Mesa. Movement of these nutrients and pathogen indicators into the Project Area is enhanced by the existing seasonal to almost year-round groundwater and permeable gravel layers within this coastal marine terrace. Realigning Tomasini Creek near the Hunt Shack would most likely result in much lower loads of nutrients and pathogens being routed through the East Pasture, at least from the Point Reyes Mesa residential development, and would decrease the potential for these more polluted waters downstream of the Hunt Shack to be exchanged to Tomales Bay, because flood flows, which are more likely to convey nutrient loads to downstream sources, would be diverted into the East Pasture. Tidal action can also cause exchange of waters, but the retained tidegate/flashboard dam system tends to minimize outflow to some degree by truncating the lower part of the tidal range.

The quality of waters within the rerouted portion of Tomasini Creek would be improved through overbank flooding and related deposition of sediment, nutrients, pathogens, and contaminants onto the East Pasture floodplain. While Tomasini Creek has high concentrations of nutrients and coliforms just as do most of the other creeks and drainages, Tomasini Creek also is influenced by historic or potentially ongoing leakage from the now-closed West Marin Landfill, located upstream in the Tomasini Creek watershed. The landfill reputedly does not have the liner now required of all landfills and violates state regulations requiring a minimum of 5 feet between the bottom of the landfill and the groundwater table. The RWQCB documented the presence of leachates and cation/anion salts among other contaminants in Tomasini Creek more than one mile downstream from the landfill and just upstream of the Project Area boundary (David Elias, RWQCB, *pers. comm*.). A sediment screening study conducted in the Project Area in 2003 found detectable concentrations of cadmium within creek sediments just upstream of Mesa Road, the only detection of cadmium within the Project Area (Parsons and Allen 2004a). However, cadmium levels did not exceed standards associated with frequent or infrequent toxicity to aquatic organisms (Parsons and Allen 2004a). Rerouting of Tomasini Creek into the East Pasture would increase loading of not only nutrients and pathogens, but more toxic contaminants that are not typically a concern in rural areas such as Tomales Bay: the landfill reputedly accepted wastes for a while from other areas in the San Francisco Bay region. Without more data, it is difficult to predict the magnitude of the problem posed by the landfill. However, wetlands and their reduced or anaerobic soil environments are extraordinarily efficient in trapping and binding contaminants, as well as nutrients and pathogens, for long periods of time, as long as wetland conditions are not radically altered (e.g., dewatered). By routing flows onto East Pasture floodplains, these contaminant, nutrient, and pathogen loads are diverted from reaching Tomales Bay and decreasing water and sediment quality conditions in the southern portions of the watershed. In terms of minimizing impacts to aquatic life, floodplains are a more stable reservoir for contaminants than stream channels and bays, which are subject to more frequent erosion and redistribution of contaminated sediments.

Project Area-Olema Marsh: One of the other large changes that would occur under Alternative C comes with lowering of the water surface levels within Olema Marsh through improving hydraulic connectivity of Bear Valley Creek within Olema Marsh with Lagunitas Creek. As was discussed in detail under Soil Resources, the adaptive restoration approach proposed for Olema Marsh would result in a dramatic lowering of water surface levels in this highly impounded marsh. Water surface levels are currently perched almost 4 feet higher than the culvert invert for Bear Valley Creek at Levee Road for a number of reasons, including elimination of drainage from the western culvert, poor drainage from the eastern culvert due to low capacity and a berm near the outlet that acts as a funnel, and total submergence of the culverts at Bear Valley Road (KHE 2006b). The first phase of the adaptive restoration program would be to remove the berm and to shallowly excavate a more defined flow path for Bear Valley Creek within the marsh. These actions would lower water surface levels as much as 1- to 4 feet (KHE 2006b). As waters drain down, approximately the upper 1- to 2 feet of the marsh surface, which appear to be largely peat or undecomposed organic matter, would be dewatered and exposed to air. Through oxidation, the surface layer of these peat soils would begin to break down and decompose, causing a lowering of the marsh surface through subsidence or compaction. Subsidence rates are difficult to predict, but based on general elevations of the marsh soil surface from topographic surveys conducted, Olema Marsh could subside by approximately 0.7 to 1.7 feet.

Oxidation of peat and mineral soils triggers a range of biogeochemical reactions, some of which have important implications for water quality. Oxidation of impounded soils, particularly peat soils or soils that were historically exposed to tidal influence, can dramatically affect nutrient conditions within soils. Rapid decomposition of peat and organic-rich mineral soils can generate a pulse in mineralization or production of inorganic nutrients, with pH often driving which nutrient forms are the most prevalent (Delaune and Smith

1985, Anisfeld and Benoit 1997, Portnoy 1999, Sommer and Horwitz 2001, Parsons and Martini-Lamb 2003). Oxidation often results in a lowering in soil pH because of the production of humic acids and other types of acids, and these acids can shift the nutrient pathway away from nitrification or the production of nitrates from ammonia. In addition, introduction of saltwater can decrease binding of ammonium in soils through the higher ionic strength of saltwater (Portnoy 1999). Nutrients produced through breakdown of organic matter or such as ammonium and phosphate can either remain in drained soils, or they can be flushed into overlying waters when soils are flooded again (Delaune and Smith 1985, Portnoy 1999). Often, these pulses are very sharp, but relatively short-lived, lasting a matter of weeks (Anisfeld and Benoit 1997, Parsons and Martini-Lamb 2003). Nutrient efflux into overlying waters may also be spatially variable, with areas exposed to tidal influence having higher rates of efflux because of cation exchange.

In addition to nutrient pulses, inundation of recently dewatered or drained soils can cause pH within overlying waters to plummet, at least temporarily. The severity of this reduction in pH depends on the soil substrate and the degree of current or historic tidal influence. The pH in overlying waters often drops lower in saline or tidally influenced soils (pH ~2-4 with pH 7 considered normal or neutral) than in freshwater wetland or peat soils (pH ~5.0), because oxidation of pyrite and other iron-sulfur compounds in tidally influenced soils leads to extensive production of additional acidic compounds (e.g., sulfuric acid and ferrous iron; Delaune and Smith 1985). In freshwater wetlands, acidity is primarily produced by breakdown of peat into humic acids. The peat underlying Olema Marsh is expected to be relatively fresh or low salinity in nature, at least within surface layers, because tidal influences have been largely precluded or at least limited since construction of Levee Road in the late 1800s. However, estuarine-derived muds and peat probably underlie the peat at some unknown depth. Therefore, pHs generated by breakdown of organic matter would be expected to be closer to 5 than 2-4. The persistence of acidic conditions within overlying waters depends to a large degree on the influx rate of waters high in carbonates such as seawater, groundwater, or streams, with acids typically quickly buffered in wetlands with some consistent source of water. Low pHs typically persist for longer periods of time in systems with no to very low sources of inflowing water, because acid concentrations greatly exceed that of available carbonates. **Permanent Bear Valley Creek inflow, combined with persistent subsurface groundwater inflow from the Inverness Ridge, would be expected to buffer acids within a short time of being produced, although there could be some spatial variability within the marsh where lower pHs would persist.**

Decomposition of peat soils can also affect water quality by releasing soluble, partly decomposed organic matter into overlying waters, thereby increasing oxygen demand and decreasing dissolved oxygen levels (Anisfeld and Benoit 1997). A similar phenomenon was observed in the East Pasture drainage ditches: organic matter is constantly introduced into ditch waters by frequent dredging, which disturbs both rooted and floating vegetation and undecomposed organic matter in ditch soils. In ditches, dissolved oxygen levels rarely exceed 5 mg/L and are typically below 2 mg/L. Dissolved oxygen within Olema Marsh waters would be expected to drop in response to decomposition of peat soils, with effects being more prolonged than that for pH and possibly extending through the second year after restoration is completed.

These same biogeochemical processes have implications for contaminants, as well as nutrients. Under oxidized conditions, many marsh soils will release sediment-bound contaminants into overlying waters. Oxidation in and of itself does not necessarily lead to release of metals, but oxidation combined with a sharp decrease in pH as is often observed in saline soils can encourage a "pulse" of formerly sediment-complexed metals into the water column. Studies have documented releases of a variety of metals, including silver, aluminum, cadmium, chromium, copper, iron, manganese, nickel, lead, selenium, and zinc (Delaune and Smith 1985, Soukup and Portnoy 1986, Gambrell et al. 1991, Anisfeld and Benoit 1997). Release of contaminants such as metals appears to be higher from saline or saltwater wetland soils than freshwater wetland ones, probably because of the lower pHs often present in oxidized tidally influenced soils (pH ~3-4) than in freshwater wetland ones (~5.1; Delaune and Smith 1985). Soils high in humic acids or organic carbon also tend to bind metals (Syrovetnik and Neretnieks 2002), as well as organic contaminants such as DDT and chlorinated benzenes.

The potential for a pulse in metal or organic contaminants into overlying waters following draining and oxidation of Olema Marsh soils would appear relatively minor given the relatively low probability of any historic or current exposures to organic contaminants or metals, even metals such as nickel, chromium, and valanium that are naturally high in the ultramafic or serpentine soils found in the Franciscan Formation, which is prevalent throughout the San Francisco Bay region and the eastern side of Tomales Bay, including the Bolinas Ridge (Hornberger et al. 1999) The sediment screening survey conducted in the Project Area in 2003 did show ubiquitously high levels of nickel and chromium in the Project Area, except in Fish Hatchery Creek

(Parsons and Allen 2004a). The upper portions of Fish Hatchery Creek, as well as Bear Valley Creek, drain completely off the Inverness Ridge, which is dominated by granitic rock such as quartz-diorite and granodiorite that probably contains low levels of metals relative to the Franciscan Formation (G. Kamman, KHE, *pers. comm*.).

Over time, subsidence would be expected to reach equilibrium with water surface levels, but while subsidence can occur relatively rapidly, the long-term effects of drainage on sediment nutrient pools and fluxes into overlying waters can persist for some time, with effects noted in some marshes even 10 years after marshes had been drained (Portnoy 1999). Within the short-term, assumed to be at least 10- to 15 years for this impact indicator, a large degree of variability in water quality conditions would be expected, primarily in nutrient loading to overlying waters as surface soils in Olema Marsh adjust to being dewatered. Pulses of phosphates from soils would not necessarily violate any Basin Plan or USEPA objectives, because there are no phosphate objectives. Pulses of ammonia could cause exceedances of the unionized ammonia objective, although periods of low pH would restrict unionized ammonia production. Depending on oxygen levels, ammonia could also be rapidly converted to nitrates either within the marsh or downstream of the marsh in Lagunitas Creek. Sharp pulses in nitrates caused by conversion from ammonia could cause exceedance of the USEPA objectives for nitrate concentrations exceeding 10 mg/L. Low oxygen levels would favor ammonia or potentially production of nitrites, a typically transient form of nitrogen that is toxic to people and wildlife and is regulated by the USEPA.

Declines in pH would be expected to be a much more transient issue and unlikely to persist for more than a few weeks to a month, given the steady influx of carbonate-rich waters into the Olema Marsh capable of buffering acids produced. These temporary declines in pH would exceed Basin Plan objectives for pH both in terms of ambient pH objectives that specify a range of 6.5-8.5 and project-related objectives of not causing more than a 0.5 change in pH. While pH changes would not be expected to extend much outside Olema Marsh itself, nutrient spikes would affect both the marsh and Lagunitas Creek, at least temporarily increasing loading rates to southern Tomales Bay. For this reason, short-term effects of this alternative in Olema Marsh water quality would be characterized as minor to moderate and adverse. From an overall project perspective, these negative effects are buffered over the short-term by the marked improvement in water quality conditions in the Giacomini Ranch under all alternatives.

Over the long-term, the proposed actions would be expected to have a beneficial effect on water quality within Olema Marsh, as the marsh came into equilibrium with changed water surface level conditions. Currently, Olema Marsh occasionally (>25 percent and <50 percent) exceeds Basin Plan objectives for minimum oxygen levels within waters, with long residence times and high primary productivity apparently causing episodes of hypoxia or low oxygen, even during the day (Parsons, *in prep*.). As with Lagunitas Creek, Bear Valley Creek and Olema Marsh also regularly exceed AWWA (1990) standards for minimization of eutrophic conditions within estuaries, with nitrate concentrations exceeding 1 mg/L more than 50 percent of the time (Parsons, *in prep*.). As discussed under the other alternatives, nitrate concentrations decreased, on average, by 0.85 mg/L or 37 percent between the upstream and downstream portions of the marsh (Parsons, *in prep*.).

Fecal coliform patterns were more variable, with instantaneous loading rates sometimes increased at downstream sampling locations, which suggests localized contribution to coliform loads from waterfowl that commonly use the marsh or leaking septic systems. The flat or low topographic gradients present in this system may increase residence time sufficiently to promote assimilation of nitrates by aquatic plants or phytoplankton in the stream channel or conversion from nitrates to nitrogen gas through denitrification: floodplains have not necessarily been found in other systems to be very effective in trapping nitrates (van der Lee et al. 2004), with stream channels and floodplains most effective in trapping sediment-associated forms of nitrogen such as ammonia and organic nitrogen. While the proposed actions would change the structure of Olema Marsh, it would still be expected to remain largely a freshwater marsh with pockets of brackish marsh that would still be subject to flooding and therefore should continue to have beneficial effects on reducing nitrates. Ultimately, exceedance of AWWA nitrate standards would be expected to decrease in frequency to only occasionally exceeding these objectives. Fecal coliform concentrations would decrease slightly, but with major sources of coliforms present both upstream on Bear Valley Creek and potentially on the perimeter from small drainages and groundwater, the degree of reduction really possible is limited.

Pollutant Retention and Effects on Tomales Bay: Under Alternative C, the West Pasture levee would be completely removed, and tidal channel excavation would be increased in the East Pasture, which would increase conveyance and exchange of waters. While levees would be completely removed, the frequency of overbank flooding from Lagunitas Creek into the East Pasture would still be identical to that under Alternative B (2-year flood events). However, the volume of floodwaters from Lagunitas Creek conveyed through the

West Pasture would increase slightly, although the East Pasture still accounts for more than 99.9 percent of the reduction in cumulative floodwater volume in Lagunitas Creek under a 2-year event (KHE 2006a). Based on hydraulic modeling, cumulative floodwater volume from Lagunitas Creek conveyed into the West Pasture during a 2-year event would climb from much less than 1 percent under Alternative B to approximately 0.5 percent under Alternative B (KHE 2006a). Potential retention of suspended sediment on West Pasture floodplains during a 2.25-year flood event would increase from approximately 23 tons/day under Alternative B to 241 tons/day.

The reduction in sediment and potential pollutant delivery to the Bay would increase from 17.8 percent (8,900 tons/day) under Alternative B to 18.8 percent (9,400 tons/day) under Alternative C. Calculated fecal coliform loading rates on the Giacomini Ranch floodplains during this same flood event would increase slightly from Alternative B to 1.7 million MPN/s or 102 million MPN during a one-hour period, resulting in a 16.9 percent reduction in downstream loading. In addition, using an estimate of 20 percent retention (Kadlec and Knight 1996), instantaneous phosphate loading rates in Lagunitas Creek could be reduced as much as 3.8 percent or 1.5 mg/s or 90 mg during just that one hour of flooding (Parsons, *in prep*.). As discussed earlier, nitrates did not appear to be as readily retained by floodplains, however, assuming a trapping efficiency rate of approximately 3 percent, the instantaneous loading rate of nitrate in Lagunitas Creek during an approximately 2-year event would be reduced by 0.6 percent relative to 0.3 percent under Alternative A. This would result in a total reduction in instantaneous nitrate loading rates of 1.25 mg/s or 75 mg during a one-hour period.

Possible Additional Mitigation Measures: It should be noted that potential water quality impacts described for the Olema Marsh system would be transient and transitional. The continuous inflow of waters to the area from upland freshwater sources, as well as tidal influence, would buffer the potential pH variations and limit these to very localized, short-duration events. However, possible additional mitigation measures might also include actions that could be used to implement more gradual change in water surface levels in Olema Marsh. Through a gradual reduction in water surface levels, potential acute water quality impacts described above would be minimized. Currently, water level in the Olema Marsh is controlled by an extensive fill area or vegetated berm directly at outflow location under Levee Road. An initial treatment might be to cut through this sill and improve a flow path through the Project Area, but not to remove it entirely so that water levels would drop more gradually. In order to minimize some of the identified water quality impacts in the Olema Marsh, actions to remove established vegetation and initiate establishment of a flow path would be used to allow headcutting and channel downcutting over time. The reduction of water level in the marsh would be less predictable, but would occur over a longer period of time.

Effectiveness of Possible Additional Mitigation Measures: By instituting a more gradual reduction in water surface levels, some of the adverse effects associated with pulses in nutrients and acids that would further impact vegetation communities in Olema Marsh might be lessened or tempered to some degree. However, ultimately, the water quality conditions will be impacted to some degree with or without this mitigation measure. While slowing down the process might minimize potential poor water quality events, it may lengthen the time that it takes for a new equilibrium to be established. Because the identified impacts would be very localized and transient, the extent and duration of this potential measure may delay achievement of equilibrium conditions and improved water quality.

Cumulative Impacts: There are at least four (4) currently proposed projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented, the Bear Valley Creek Watershed Enhancement Project, Chicken Ranch Beach Enhancement, the East Shore Wastewater Improvement Project, and the County of Marin's Culvert Cleaning Project, generally described in Table 25 of this chapter. Most of these projects were discussed in detail under Alternative A and would be expected to have cumulatively beneficial long-term effects, although, in the case of the culvert cleaning, there could be potentially some minor, short-term adverse effects, particularly in combination with short-term adverse effects predicted for Olema Marsh as part of the adaptive restoration. However, these conditions would be transient in nature and largely localized to the marsh itself. Cumulatively, the actions under Alternative C and other projects identified here would result in minor short-term benefits, and, as Olema Marsh reaches equilibrium conditions, moderate long-term cumulative benefits to water quality would be expected for the southern portions of Tomales Bay.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: As with Alternative B, Alternative C would have much greater benefits to water quality over the long-term in the Project Area than the No Action Alternative. Alternative C would be expected to have major beneficial effects over the long-term on water quality in both the East and West Pastures, as well as in Tomasini Creek and Olema Marsh. There would be some moderate adverse effects to water quality over the short-term in Olema Marsh from lowering of water surface levels within this highly impounded system and the associated biogeochemical reactions to dewatering and oxidation or breakdown of peat soils. In the case of nutrients, these short-term adverse effects would impact not only Olema Marsh, but Lagunitas Creek and southern portions of the watershed in the form of sharp spikes potentially in nutrient loading rates. However, these effects would be expected to be either very transient as in the case of declines in pH or to decline with time as in the case of nutrients as the marsh comes into equilibrium with its new conditions. From an overall project perspective, the impact of these adverse effects would be buffered by the steady improvement in water quality conditions within the Giacomini Ranch and Tomasini Creek. Negligible adverse effects may also occur during construction from temporary installation of coffer dams and accidental fallback of sediment into waters from excavation of levees along Lagunitas Creek. However, Best Management Practice (BMPs) would be instituted to minimize the effects of these actions on water quality within and downstream of the Project Area.

From a Lagunitas Creek perspective, the combination of the increased frequency of overbank flooding and the slightly greater cumulative floodwater volume routed through the East and West Pastures under Alternative C relative to Alternative B would increase the potential water quality benefits of this alternative to the southern portion of the watershed. In addition, the long-term improvement in water quality conditions in Tomasini Creek and Bear Valley Creek would also have positive impacts on watershed water quality. For this reason, Alternative C would be expected to have at least a moderate beneficial effect on water quality downstream of the Project Area in southern Tomales Bay. With elimination of grazing and elimination of intensive agricultural management practices, overbank flooding by Lagunitas and Tomasini Creeks onto the Giacomini Ranch floodplains would be expected to contribute positively to the water quality of the southern portion of Tomales Bay by filtering sediment, nutrients, pathogens, and contaminants, which is one of the more functions that wetlands play. The extent of improvement is limited to some degree by the continued influx of high loads of nutrients and pathogens from small creeks, drainages, and emergent groundwater into the Project Area. Over the long-term, overbank flooding from both Lagunitas Creek and Tomasini Creek onto floodplains would be expected to have at least a moderate beneficial effect on water quality within the southern portion of Tomales Bay by decreasing loading of sediment, coliform, phosphate, and certain forms of nitrogen, with reductions in suspended sediment and instantaneous coliform loading estimated to be as high as 18.8 percent and 16.9 percent, respectively, during approximately 2-year flood events.

Alternative D

Analysis: Alternative D would have identical negligible to major beneficial effects as Alternative C on water quality in the Project Area and the southern portion of the Tomales Bay watershed (Table 58). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. In terms of water quality, the only substantial difference would be the replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, which may have some additional negligible beneficial effects on water quality in Tomasini Creek. Tomasini Creek would be completely realigned into one of its historic alignments just downstream of Mesa Road, which could eliminate potential contributions of nutrients and pathogens from the worker housing adjacent to Tomasini Creek just west of Mesa Road. In addition, there would be excavation of even more new tidal channels in the East Pasture, further increasing flow conveyance and exchange of waters with Tomales Bay. Cumulative floodwater volume would increase negligibly under this alternative in both the East and West Pastures, with negligible increases potentially in deposition of suspended sediment, pathogens, and other nutrients on Giacomini Ranch floodplains.

There would be no change in restoration approach in the West Pasture from Alternative C, and the same adaptive management approach would be undertaken in Olema Marsh, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Possible Additional Mitigation Measures: Possible mitigation measures to address potential impacts of actions in the Olema Marsh are described under Alternative C.

Effectiveness of Possible Additional Mitigation Measures: Same as Alternative C.

Cumulative Impacts: Cumulative impacts would be identical to those described under Alternative C.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative D would have identical negligible to major beneficial effects as Alternative C on water quality in the Project Area and the southern portion of the Tomales Bay watershed (Table 58). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. In terms of water quality, the only substantial difference would be the replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, which may have some additional negligible beneficial effects on water quality in Tomasini Creek. Tomasini Creek would be completely realigned into one of its historic alignments just downstream of Mesa Road, which could eliminate potential contributions of nutrients and pathogens from the worker housing adjacent to Tomasini Creek just west of Mesa Road. In addition, there would be excavation of even more new tidal channels in the East Pasture, further increasing flow conveyance and exchange of waters with Tomales Bay. Cumulative floodwater volume would increase negligibly under this alternative in both the East and West Pastures, with negligible increases potentially in deposition of suspended sediment, pathogens, and other nutrients on Giacomini Ranch floodplains. The reduction in sediment and fecal coliform delivery to Tomales Bay would climb slightly relative to Alternative C to 19 percent and 17.1 percent, respectively, thereby resulting in a moderate beneficial effect on downstream water quality.

Vegetation Resources

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Many native vegetation communities within the United States have been adversely impacted by introduction of non-native plant species, as well as a host of other anthropogenic factors such as commercial, residential, and agricultural development, and resource extraction. These activities have affected all vegetation communities, but the most highly publicized and pervasive threats are perhaps those to wetland and riparian communities. Because of the important functions wetlands and riparian areas provide to plants, wildlife, and humans, these habitats are often subject to oversight from federal, state, and local agencies.

The U.S. Army Corps of Engineers (Corps) oversees Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, both of which serve to ensure that impacts to navigable waters and special aquatic sites such as wetlands through discharge of fill or dredged material are minimized. In addition, wetlands are also regulated under other federal and state statutes and policies, including Section 401 of the Clean Water Act, the federal and California Coastal Act, the Porter-Cologne Act, and Park Service Management Policies. Some of these interpret impacts to include a much broader range of actions, including placement of material in upland areas that could affect wetlands, groundwater withdrawals, and livestock grazing. Riparian areas may or may not be considered wetlands under Section 404, but they are often regulated through establishment of "buffers" or non-development areas by other regulations and policies, including the Local Coastal Program (LCP) and California Coastal Commission (CCC) in the Coastal Zone, California Department of Fish and Game (CDFG) under Lake and Streambed Alteration Agreements, and the Point Reyes Station Community Plan. A more complete description of these policies can be found in Chapter 3 under Vegetation Resources.

Wetlands and other native vegetation communities provide habitats for native plant species, some of which have decreased dramatically in numbers or range because of development and threats from non-native species. In recognition of these threats, federal and state agencies have moved to protect individual plant species under federal and state Endangered Species Acts (ESA). The federal ESA of 1973, as amended, requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) before taking actions that could jeopardize the continued existence of any federally listed plant or animal species (i.e., listed as threatened or endangered) or species proposed for listing. Threats to state-listed species require consultation with CDFG. Park Service policies require parks to not only avoid impacts to threatened and endangered species, but to look for opportunities to restore these habitats for these species (NPS 2006; Section 4.4.2.3). The U.S. Department of the Interior (DOI) NEPA significance criteria mandates that any

actions that may have a significant impact to species listed or species proposed for listing as threatened and endangered warrant evaluation in an EIS. Through establishment of CEQA significance criteria, Marin County evaluates proposed actions for their not only their potential to reduce numbers of endangered, threatened, or rare species, but to cause substantial alterations of their habitats, whether or not they are designated as Critical Habitat by the USFWS.

Many vegetation communities and special status plant species have been severely threatened by the introduction and rapid spread of non-native invasive plant species. Park Service Management Policies (2006) direct parks to manage and, if possible and prudent, eradicate invasive species that interfere with natural processes and the perpetuation of natural features, native species or habitats (Section 4.4.4.2). In addition, "exotic species will not be allowed to displace native species if displacement can be prevented" (Section 4.4.4). DOI has defined actions that "contribute to the introduction, continued existence, or spread of noxious weeds or non-native species … or actions that may promote the introduction, growth, or expansion of the range of such species" as a criteria whether a project's actions might be significant enough to warrant an EIS.

General Assumptions and Methodologies

- The purpose of the proposed project is to restore natural hydrologic and ecological processes and functions and processes, which includes processes and functions associated with native vegetation communities.
- Changes to vegetation communities are analyzed using maps that predict long-term changes in vegetation communities based on computer-modeled changes in the extent and degree of tidal influence, as well as qualitative interpretation of the extent and strength of freshwater influences such as overbank flooding from creeks and surface flow from groundwater sources along the perimeter of the Project Area.
- For this impact topic, the duration category, "Short-Term," refers to a period of approximately 10 years during which vegetation communities would be expected to be in a transitional phase between baseline or construction and long-term conditions.

Described below are methodologies for significance criteria related to vegetation resources, including specific assumptions or details on methodologies.

Changes in Areal Extent of Native Vegetation Communities: Impact thresholds focus on change in vegetation resources in the Project Area, specifically changes in the areal extent of lands dominated or co-dominated by native vegetation communities relative to baseline conditions (Table 59). While not all non-native plant species are invasives and/or are documented to have negative effects on native plant species communities or wildlife habitats, vegetation communities dominated by natives are considered to have more ecological integrity and be perhaps more likely to support to native wildlife through providing habitat, food, and other important relationships, some of which may yet to be documented through research. The Park Service Management Policies (2006) require parks to preserve and restore the natural abundances, diversities, dynamics, and habitats of native plant and animal populations and the communities and ecosystems in which they occur (NPS 2006; Section 4.4.1). The documented or potential importance of vegetation communities dominated by native plant species is one of the reasons that some wetland functionality assessment methodologies include native vegetation communities.

In this analysis, the percentage of the Project Area dominated or co-dominated by native plant species or associations (grouping of plants) are evaluated under the various alternatives. As defined by the Seashore vegetation mapping methodology, a plant species is considered a dominant or co-dominant component of its community when it comprises 30 percent or more of the relative cover (Schirokauer and Parravano 2003). Native species are defined using criteria in the California Invasive Plant Council and/or Jepson Manual (1993) regarding the origin of species (i.e., native, non-native, or naturalized). The Park Service conducted a detailed assessment of vegetation within the Project Area that included mapping of plant associations or groupings of one to three dominant plant species (Parsons and Allen 2004b). Plant associations consisting either wholly of native species or that had less than 25 percent cover of non-native species were mapped as native vegetation communities.

Analysis of potential changes in cover or areal extent of native vegetation communities with implementation of the various alternatives is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium, or, more accurately, dynamic equilibrium conditions have been reached. Some of this analysis relies on information or knowledge regarding the potential invasibility of vegetation communities or which vegetation communities are less likely to support a dominant cover of non-native

species. Communities that are less likely to support a dominant cover of non-native species include Tidal Salt Marsh, Tidal Brackish Marsh, Freshwater Marsh dominated by tall and medium-sized emergent species, Forested Riparian, Scrub Shrub Riparian, and Moist Grassland dominated by wildrye (*Leymus triticoides*), etc., although non-native species may occur intermixed with native species. For the duration category in vegetation communities, "Short-Term," refers to a period of approximately 10 years.

TABLE 59. NATIVE VEGETATION COMMUNITIES

Source: Park Service Management Policies, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area **Duration:** Short-Term, Long-Term	
No Impact	There would be no potential for impact to vegetation communities associated with the proposed project.
Negligible	There would be a negligible change (± 10 percent) in the areal extent of native vegetation communities.
Minor	There would be a minor change (±10 – 25 percent) in the areal extent of native vegetation communities.
Moderate	There would be a moderate change (± 26 – 50 percent) in the areal extent of native vegetation communities.
Major or Substantial	There would be a substantial or major change (>50 percent) in the areal extent of native vegetation communities.

Changes in Wetlands: Impact thresholds focus on change in wetland resources, specifically changes in the areal extent of wetlands relative to baseline conditions (Table 60). Many of the functions associated with wetlands such as floodwater storage, water quality improvement, and wildlife habitat are evaluated separately in other sections. For evaluation purposes, the jurisdictional extent of wetlands subject to Corps' regulation under Section 404 of the Clean Water Act is used as the wetland boundary to assess changes relative to existing conditions. ***However, this impact indicator does NOT analyze impacts to wetlands strictly on the basis on specific regulations issued by the Corps or other federal, state, and local agencies,*** although it does reference conditions in the Corps' Nationwide Permit #27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities) and Park Service policies (see below), particularly for setting impact thresholds for adverse impacts. Unlike regulations, however, these thresholds primarily evaluate change on the basis of whether the proposed project would either permanently impact existing wetlands such that wetlands would be eliminated or would no longer function as wetland or would cause only temporary disturbances that would not ultimately affect wetland characteristics or wetland functioning.

Federal policy requires proposed actions to result in no net loss of wetlands, and Park Service Management Policies push parks to strive for a net gain in wetland acreage. For this reason, impact thresholds reflect this mandate by establishing more stringent thresholds for adverse impacts. The Park Service requires a statement of finding and mitigation for any projects that may impact > 0.25 acres of "natural" wetlands except for those related to recreational facilities (e.g., overlooks, bike/foot trails, and signs) and minor stream crossings that completely span channel and wetlands (i.e., no pilings, fill, or other support structures). Under the LCP, diking, filling, and dredging in wetlands are allowable for the purpose of restoration if the alternative with the least environmental impacts is selected.

Beneficial impacts to wetlands through "net gain" in wetland acreage are evaluated using a broader range of criteria, because the high losses of wetlands that have occurred historically requires a higher percentage gain to be considered significant, particularly when viewed in a larger context such as the Tomales Bay watershed or the central California coast. Analysis of changes in cover or areal extent of wetlands is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium, or, more accurately, dynamic equilibrium conditions have been reached.

TABLE 60. WETLANDS

Source: Section 404 and 401 of the Clean Water Act, Park Service Management Policies, Coastal Act/Marin LCP, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed, Supraregional (central California coast) **Duration**: Construction, Long-Term	
No Impact	There would be no potential change in the areal extent of wetlands associated with the proposed project.
Negligible	***Beneficial***: There would be a negligible increase (≤ 0.05 acre) in the overall areal extent of wetlands. ***Adverse***: There would be a negligible decrease (≤ 0.1 acre) in the overall areal extent of wetlands.

TABLE 60. WETLANDS

Minor	***Beneficial***: There would be a minor increase (> 0.05 and ≤ 1 acre) in the overall areal extent of wetlands. ***Adverse***: There would be a minor decrease (> 0.1 acre and ≤ 0.25 acre) in the overall areal extent of wetlands.
Moderate	***Beneficial***: There would be a moderate increase (> 1 and ≤ 5 acres) in the overall areal extent of wetlands. ***Adverse***: There would be a moderate decrease (> 0.25 acre and ≤ 1.0 acre) in the overall areal extent of wetlands. If the decrease in overall areal extent of wetlands is > 1.0, the loss must be for the purpose of Aquatic Habitat Restoration, Establishment, and Enhancement Activities as defined by conditions in the Corps' Nationwide Permit #27.
Major or Substantial	***Beneficial***: There would be a substantial and major increase (> 5 acres) in the overall areal extent of wetlands. ***Adverse***: There would be a substantial or major decrease (> 1.0 acre) in the overall areal extent of wetlands, or a clear potential for violation of federal, state, or local wetland protection policies .

Changes in Extent of Riparian and Bluff Habitat: Impact thresholds focus on change in riparian and bluff resources, specifically changes in the areal extent of riparian and bluff habitat relative to baseline conditions (Table 61). Many of the functions associated with riparian habitat such as water quality improvement and wildlife habitat are evaluated separately in other sections. Several agencies oversee activities and development in riparian habitat, including the Corps, which regulates impacts to portions of riparian habitat that are considered "wetlands;" CDFG, which regulates both wetland and non-wetland habitat on state, local, and privately owned lands; and Marin County, which has developed LCP and Community Plan policies relating to both riparian and Point Reyes Mesa bluff habitat. For analysis purposes, the extent of riparian habitat subject to LCP oversight under the Coastal Act is used as the riparian habitat boundary to assess change relative to existing conditions. This boundary may include riparian areas that would be considered both jurisdictional and non-jurisdictional wetlands by the Corps.

Within the Coastal Zone, the Streamside Conservation Area (SCA) is defined to include all riparian vegetation on both sides of the stream AND the area 50 feet landward from the edge of the riparian vegetation (Marin County Comprehensive Planning Department 1981). In no case shall the stream buffer be less than 100 feet in width, from either side of the stream, as measured from the top of the stream bank. In addition, the LCP (Marin County Comprehensive Planning Department 1981) and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) have developed some specific protection objectives regarding the Point Reyes Mesa bluff, including "preservation of the physical, ecological, and visual integrity of the bluff area located above the old railroad right-of-way through the development review process establishment of a 100-foot buffer zone extended eastward from the eastern edge of the railroad grade."

As with wetlands, because federal, state, and local policies have tried to halt the downward trend in the numbers of acres of riparian habitat, impact thresholds for adverse impacts to riparian and bluff resources reflect this regulatory agenda by establishing stringent thresholds for evaluating intensity of impacts. While thresholds cannot be interpreted as evaluating compliance with any one set of regulations or policies, thresholds for adverse impacts do draw upon federal, state, and local policies. The Park Service requires a statement of finding and mitigation for impacts >0.25 acres of "natural" wetlands, which include riparian areas that would be considered wetlands, except for projects related to recreational facilities (e.g., overlooks, bike/foot trails, and signs) and minor stream crossings that completely span channel and wetlands (i.e., no pilings, fill, or other support structures). Under the LCP, no development or vegetation removal is permitted within the SCA unless no alternatives are feasible. Similar to regulations governing impacts to wetlands, permanent loss of riparian habitat is construed as removal with no potential for future reestablishment (i.e., riparian habitat replaced with structure), whereas temporary impacts are considered those that might trim or remove vegetation and thereby temporarily decrease functionality, but would be expected to rapidly re-establish. Situations in which rapid re-growth would not occur naturally and would therefore require intervention through plantings to reestablish riparian vegetation would be considered a permanent impact.

Similar to the analysis for wetlands, beneficial impacts on riparian habitat through "net gain" of acreage are analyzed using a broader range of criteria, because gains in riparian habitat will have to be relatively high to offset the high losses suffered historically and to therefore be considered major or substantial, particularly when viewed in a larger context such as the state. Analysis of changes in cover or areal extent of riparian communities is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium, or, more accurately, dynamic equilibrium conditions have been reached.

TABLE 61. RIPARIAN AND BLUFF HABITAT

Source: Coastal Act/Marin LCP, Community Station Plan, Park Service Management Policies CDFG Lake and Streambed Alteration Agreement **Nature**: Beneficial, Adverse **Context**: Project Area, Supraregional (California) **Duration**: Construction, Long-Term	
No Impact	There would be no potential for impact to riparian habitat associated with the proposed project.
Negligible	***Beneficial***: There would be a negligible increase (≤ 0.5 acre) in the areal extent of riparian habitat. ***Adverse***: There would be a negligible decrease (≤ 0.1 acre) in the areal extent of riparian habitat.
Minor	***Beneficial***: There would be a minor increase (≤ 1 acre) in the areal extent of riparian habitat. ***Adverse***: There would be a minor decrease (> 0.1 acre and ≤ 0.25 acre) in the areal extent of riparian habitat.
Moderate	***Beneficial***: There would be a moderate increase (> 1 and ≤ 5 acres) in the areal extent of riparian habitat. ***Adverse***: There would be a moderate decrease (> 0.25 acre and ≤ 1.0 acre) in the areal extent of riparian habitat.
Major or Substantial	***Beneficial***: There would be a substantial and major increase (> 5 acres) in the areal extent of riparian habitat. ***Adverse***: There would be a substantial and major decrease (> 1.0 acre) in the areal extent of riparian habitat and/or a potential for violation of federal, state, or local riparian habitat protection policies.

Effect on Special Status Plant Species: Impact thresholds focus on effects of the proposed project on special status plant species, specifically potential changes in number of plants and areal extent of habitat relative to baseline conditions (Table 62). The Project Area does not provide habitat for any threatened or endangered plant species, but does support several plant species that are considered of concern to the Sacramento USFWS office and the California Native Plant Society (CNPS). The proposed project could affect viability of these annual species through both construction- and project-related actions. For the purposes of this analysis, separate impact indicators have been developed for construction and project-related effects. Construction-related effects are based on incorporation of standard Best Management Practices (BMPs) related to minimizing impacts of construction on annual plant species. Because the seed bank for most of these species is long-lived and can persist for more than 100 years, impacts to reproduction during construction are scaled accordingly, such that construction occurring during a portion of the reproduction season would not necessarily be considered a major or substantial impact. In addition, the typical season of reproduction does vary from year to year due to environmental conditions such as the amount and timing of precipitation.

For project-related effects, the potential effect of the project on areal extent of habitat size and, to a lesser degree, population stability is considered. The proposed project also incorporates the potential for beneficial and adverse impacts to special status plant species. Plant species within the Project Area are largely annual plant species with a high interannual variability in numbers, with the range in numbers between consecutive years for some occurrences varying as widely as 250 to 6,000 plants. These annual plant species are also highly responsive to precipitation and disturbance patterns and able to persist through less optimal environmental conditions due to a long-lived seed bank. For these reasons, population stability was deemphasized under this impact indicator because of the inability to reliably interpret subtle trends in plant numbers. To some degree, context is used to assess intensity, because actions conducted as part of the proposed project will have to be considered in a larger context to accurately interpret the intensity of effects with respect to viability of regional subpopulations, extent of the species' range, or viability of the species as a whole. Analysis of changes in special status plant species habitat is based on knowledge of species' general habitat requirements, along with any microtopographic affinities (e.g., specific elevation zones, topographic features such as swales, or typical plant associates) within these broader habitat categories. Analysis of changes in cover or areal extent of special status plant species habitat is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium, or, more accurately, dynamic equilibrium conditions have been reached.

TABLE 62. SPECIAL STATUS PLANT SPECIES

Source: Endangered Species Act (federal and California), Regional FWS Species of Concern, Park Service Management Policies, CCC/LCP, Marin CWP, CNPS **Nature**: Adverse **Context**: Project Area **Duration**: Construction

TABLE 62. SPECIAL STATUS PLANT SPECIES

No Impact	There would be no potential for impact to special status plant species associated with construction of the proposed project.
Negligible	Construction would adhere to BMPs such that construction would not occur in those areas during the typical season of reproduction for special status plant species documented in the Project Area, with typical season of reproduction identified by the timeframe listed by either CNPS (2001) or Seashore rare plant database. Any special status plant species areas affected by construction would have topsoils stockpiled and replaced correctly.
Minor	Construction would impact at least a portion of the typical season of reproduction (≤ 33 percent) for special status plant species documented in the Project Area, with typical season of reproduction identified by the timeframe listed by either CNPS (2001) or Seashore rare plant database. Construction would adhere to stockpiling BMPs such that any special status plant species areas affected by construction would have topsoils stockpiled and replaced correctly.
Moderate	Construction would impact at least a portion of the typical season of reproduction (> 33 percent and ≤ 66 percent) for special status plant species documented in the Project Area, with typical season of reproduction identified by the timeframe listed by either CNPS (2001) or Seashore rare plant database. Construction would largely adhere to stockpiling BMPs such that most (> 50 percent) of special status plant species areas affected by construction would have topsoils stockpiled and replaced correctly.
Major or Substantial	Construction would impact most of the typical season of reproduction (> 66 percent) for special status plant species documented in the Project Area, with typical season of reproduction identified by the timeframe listed by either CNPS (2001) or Seashore rare plant database. Construction would not or only partially adhere to stockpiling BMPs such that <50 percent of special status plant species areas affected by construction would have topsoils stockpiled and replaced correctly.
Source: Endangered Species Act (federal and California), Regional FWS Species of Concern, Park Service Management Policies, CCC/LCP, Marin CWP, CNPS **Nature**: Beneficial, Adverse **Context**: Project Area, Regional (Watershed/Park), Supra-Regional (Species Range) **Duration**: Long-Term	
No Impact	There would be no potential for change in the areal extent of special status plant species habitat associated with implementation of the proposed project.
Negligible	There would be a negligible change in areal extent of special status plant species habitat (≤ 1 percent) relative to the extent of areas currently supporting these species. Would be expected to have no measurable effect on populations in the Project Area or regional distribution of species.
Minor	There would be a minor change in the areal extent of special status habitat (>1 percent and ≤ 10 percent) relative to the extent of areas currently supporting these species. Would be expected to have a measurable effect on Project Area distribution of species, but not on regional distribution.
Moderate	There would be a moderate change in the areal extent of special status habitat (> 10 percent and ≤ 25 percent) relative to the extent of areas currently supporting these species. Would be expected to have an appreciable effect on Project Area distribution of species and a measurable effect on regional distribution.
Major or Substantial	There would be a major or substantial change in the areal extent of special status habitat (> 25 percent) relative to the extent of areas currently supporting these species. Would be expected to have a major or substantial effect on Project Area distribution of species and an appreciable effect on regional distribution.

Changes in Extent of Invasive Plant Species: Impact thresholds focus on changes in non-native invasive plant species, specifically changes in the areal extent of non-native invasive plant species occurrences relative to baseline conditions (Table 63). For purposes of this analysis, evaluation focuses on non-native invasive plant species identified by the Seashore or the project planning team as high priority species for management or eradication (Seashore 1989), specifically cape ivy (*Delaria odorata*), pampas grass (*Cortaderia selloana*), English ivy (*Hedera helix*), Atlantic cordgrass and Atlantic cordgrass-Pacific cordgrass hybrids (*Spartina alterniflora* and *Spartina alterniflora* X *Spartina foliosa*), perennial pepperweed (*Lepidium latifolium*), and blackberry (*Rubus discolor*). Some of these species are currently in the Project Area, while others such as Atlantic cordgrass, Atlantic cordgrass-Pacific cordgrass hybrids, or perennial pepperweed occur in the watershed or region and have the potential for occurring in the Project Area in the future. Projects have the potential for affecting the extent of invasive plant species through 1) increasing disturbance, which can encourage expansion of species adapted to disturbance; 2) direct or indirect removal or eradication of invasive plant species occurrences; and 3) changing physical conditions such that viability of existing occurrences and potential for establishment or expansion is affected, either positively or negatively. Analysis of changes in physical or ecological conditions that could affect potential for establishment or viability and expansion

potential of existing non-native invasive species is based on results from hydraulic and hydrodynamic modeling (KHE 2006a), as well as maps that predict long-term changes in vegetation communities in the Project Area once equilibrium or dynamic equilibrium conditions have been reached (~ > 10 years).

TABLE 63. INVASIVE PLANT SPECIES

Source: Park Service Management Policies, DOI **Nature**: Beneficial, Adverse **Context**: Project Area, Regional (Park) **Duration**: Short-Term/ Long-Term	
No Impact	There would be no potential for change in the areal extent of non-native invasive plant species associated with the proposed project.
Negligible	There would be a negligible change in areal extent of non-native invasive species (± 10 percent) associated with the proposed project.
Minor	There would be a minor change in areal extent of non-native invasive species (± 11 to 25 percent) associated with the proposed project.
Moderate	There would be a moderate change in areal extent of non-native invasive species (± 26 to 50 percent) associated with the proposed project.
Major or Substantial	There would be a substantial or major change in areal extent of non-native invasive species (> 50 percent) associated with the proposed project.

Impact Analysis

TABLE 64. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR VEGETATION RESOURCES.
All impacts would be considered Project Area and are separately analyzed for Construction, Short-Term, and Long-Term.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Native Vegetation Communities Short-Term	Beneficial - Negligible	Beneficial - Negligible	Beneficial - Negligible	Adverse - Minor	Adverse - Minor
Long-Term	Beneficial - Minor	Beneficial - Moderate	Beneficial - Major	Beneficial - Major	Beneficial - Major
Wetlands Construction/Temporary	Adverse - Negligible	Adverse - Moderate	Adverse - Moderate	Adverse - Moderate	Adverse - Moderate
Short-Term/Long-Term	Beneficial - Minor	Beneficial - Major	Beneficial - Major	Beneficial - Major	Beneficial - Major
Riparian and Bluff Habitat Construction/Temporary	No Impact	Adverse - Major	Adverse - Major	No Impact	No Impact
NEPA: Intensity Following Mitigation		Moderate	Minor		
CEQA: Significance Following Mitigation		Less than Significant	Less than Significant		
Short-Term/Long-Term	Beneficial - Negligible	Beneficial - Moderate	Beneficial - Major	Beneficial - Major	Beneficial - Major
Special Status Species Construction	Adverse-Minor	Adverse - Minor	Adverse - Minor	Adverse - Minor	Adverse - Minor
Long-Term	Beneficial - Minor	Beneficial - Major	Beneficial - Major	Beneficial - Major	Beneficial - Major
Invasive Plant Species Short-Term/Long-Term	Beneficial - Negligible	Beneficial - Minor	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Moderate

No Action Alternative

Analysis: The effects of the No Action Alternative on vegetation and wetland resources in the Project Area would generally range from minor adverse to minor beneficial (Table 64). Under the No Action Alternative,

levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would no construction or expansion of public access facilities.

The No Action Alternative would have minor beneficial effects on vegetation resources in the Project Area, largely because of the elimination of intensive agricultural management practices. In Olema Marsh, where there is no agricultural use, conditions would be expected to remain fairly similar to baseline conditions. Under the existing purchase agreement with the Giacomini Trust, the Giacomini Ranch dairy had a 7-year Reservation of Use agreement that allowed the Giacomini family to continue dairying until the agreement expires in spring 2007. At that time, the dairy will close, and agricultural management practices associated with dairying will cease. These management practices include periodic removal of riparian vegetation associated with maintenance of levees and creek crossings; frequent removal of aquatic vegetation in drainage ditches; light and intensive spreading of manure; irrigation; and annual mowing. Most of these practices occur almost exclusively in the East Pasture, although there is some infrequent ditch maintenance and annual mowing in the West Pasture. In terms of management, the East Pasture represents the more intensively managed area that is characteristic of dairy operations, while the West Pasture more closely resembles the much less-intensively managed lands used for grazing of dairy heifers and beef cattle.

Under the No Action Alternative, there is a potential for leased grazing of dairy heifers or beef cattle on the Giacomini Ranch lands in the future, which would be in accordance with the parks' GMP. Leasing would undergo a separate environmental review process, but it is likely that, if lease or leases were approved, that the Seashore would institute restrictions on resource setbacks or setbacks from creeks, riparian areas, and certain wetland areas, as well as the intensity, duration, and timing of grazing. In addition, certain creeks in the West Pasture would continue to be dredged to eliminate flood risks to adjacent private residences.

Vegetation Communities: Agricultural management practices have dramatically affected vegetation communities in the Project Area. Most of the Giacomini Ranch has been turned into pastureland that is dominated by non-native herbs and forbs or grasses (Wet and Dry Pasture) through exclusion of tidal influence, irrigation, and seeding of forage species (Parsons and Allen 2004b). Approximately 467 of the 613 acres in the Project Area are dominated or co-dominated by non-native plant species. Riparian habitat has been reduced considerably through grazing and direct removal during maintenance activities, with most of the Forested and Scrub Shrub Riparian habitat now restricted to the ranch perimeters.

Some other native vegetation communities – communities dominated or co-dominated by native species -- and/or pockets of native vegetation communities such as Diked Brackish Marsh, Freshwater Marsh, and Wet Meadow have encroached upon portions of the ranch that are less actively – or less successfully -- managed by grazing, irrigation, or other agricultural practices. A large extent of the northern portions of both the West and East Pastures have slowly reverted to communities dominated or co-dominated by salt marsh or brackish marsh plant species such as Diked Brackish Marsh and Salt Marsh Pasture. This reversion is due either to direct tidal influence through failing or malfunctioning tidegates or interactions between high groundwater tables and residual salts remaining in soils from tidal action prior to levee construction. The western and eastern perimeters of the Project Area often support considerable expanses of largely unmanaged Freshwater Marsh and Wet Meadow vegetation communities due to seasonal or permanent groundwater inflow from the Inverness Ridge. This groundwater emerges at the base of the ridge and sheetflows across the pastures in addition to elevating groundwater tables in the Project Area. The most notable of these features is the 7.2-acre freshwater marsh in the northern portion of the West Pasture adjacent to Sir Francis Drake Boulevard.

Discontinuation of management practices, combined with the potential for lower grazing intensity, would be expected to keep the Giacomini Ranch largely grassland, although, over time, the plant species composition would be expected to shift some in response to the lack of seeding, irrigation, and manure spreading. The absence of irrigation is expected to have the largest effect on the southern portion of the East Pasture, which would revert to a non-native grassland with more species characteristic of upland areas. Within the northern, lower-elevation portions of the East Pasture, the removal of irrigation would have little effect on hydrology, with the soils remaining inundated or saturated even without irrigation. However, in these areas, discontinuation of irrigation would still be expected to produce some of the shifts in vegetation communities and plant species that would be similar to that already observed in northern portions of the West Pasture, where residual salts in the soils have promoted establishment of halophytic or salt-tolerant communities (Salt

Marsh Pasture, Diked Brackish Marsh) and species. These salt-tolerant communities have been expanding under existing conditions in the West Pasture because of changes in muted tidal flow with recent replacement of a tidegate. The extent of salt marsh and/or brackish marsh habitats would be expected to continue to increase not only in the portion of the pasture directly adjacent to the north levee, but in the northern portion of the freshwater marsh. Over the long-term, discontinuation of management practices would be expected to result in deterioration of the levees such that conditions may come to resemble those described under Alternative C. However, the trajectory of these changes is difficult to predict in light of the strong interaction between levee deterioration and wet years or series of large storms.

Some of the potential changes in vegetation communities would be determined to a large extent by whether or not leased grazing occurs. Without grazing, the pastures, and particularly the East Pasture, would be expected to respond dramatically to the removal of grazing pressures through substantial increases in overall plant biomass and rapid expansion of weedy, ruderal species such as thistles (e.g., milk thistle or *Silybum marianum)* and non-native grasses (e.g., common velvet grass or *Holcus lanatus*) that appear well-adapted to exploiting nutrient-rich soils and reduced grazing pressure. This dynamic has been well-documented in vernal pool wetlands, where grazing is removed to protect endangered and threatened plant species only to result in a rapid increase in grassland height and biomass that either shades out or encroaches upon the rare plant species and threatens population viability. Within the Seashore, removal of grazing from one of the historic ranches near Drake's Beach – D Ranch – led to an explosion in cover and overall height of grasses and thistles, including common velvetgrass, poison hemlock (*Conium maculatum*), perennial ryegrass (*Lolium perenne*), and bull thistle (*Cirsium vulgare*; NPS unpub. data).

The potential for this phenomenon to occur – and the intensity if it does occur -- would be dictated by a number of factors, including presence and intensity of leased grazing, the nutrient content of soils, and the salt content of waters and soils. While lighter in intensity, leased grazing would be expected to maintain biomass and vegetation more characteristic of grazed lands depending upon grazing restrictions imposed by the Seashore for resource protection needs. Variability in nutrient loads would also affect vulnerability to invasion by weedy species. As discussed under Soil Resources in Chapters 3 and 4, nutrient concentrations within soils may differ between grazed and ungrazed areas, with some of the East Pasture areas having roughly double the nitrate and phosphate content of soils in the undiked marsh north of Giacomini Ranch (NPS, unpub. data). Nitrate concentrations are even higher in areas where manure was intensively spread, with levels 42 times higher than intensively grazed areas in other portions of the East Pasture (NPS, unpub. data). Some weedy or ruderal species are well-adapted to high nutrient conditions, expanding rapidly and either outcompeting or shading out other species, including native ones that may not be respond as rapidly to disturbance and changes in conditions because of low rates in seed production, clonal expansion, and recruitment. In terms of plant distribution, the effects of nutrient enrichment appear to be long-lived, with former agricultural lands believed to perhaps take decades for nutrients to decrease to levels characteristic of non-agricultural lands.

The pressures of lowering or eliminating grazing intensity and nutrient-enriched soils are countered to some degree in areas where there is either a direct source of salt from muted tidal inflow or from elevated groundwater tables interacting with residual salts in the soil. Some areas within the West Pasture had soil salinities as high as 60 ppt, which is almost double the salinity of seawater. Many non-native species cannot physiologically tolerate elevated soil salinities physiologically, which is one of the reasons why functioning, undisturbed salt marshes support largely native plant species and vegetation communities. Most of the invasion of non-native species takes place within higher elevation portions of salt marshes and upland ecotones, where salinities are lower and most of the development in terms of levees and roads occur. Even slight decreases in salinity can increase the number of non-native plant species, with a considerably larger number of non-native species occurring in brackish (salinities ~ 0.5 to 30) habitats, particularly diked brackish habitats or ones not regularly or exposed daily to tidal action.

Based on these factors, the most visible response to removal of grazing and agricultural management would probably occur in the East Pasture, where nutrient concentrations are higher due to higher historic levels of grazing intensity and manure spreading. Salinity patterns within the groundwater table would suggest that, within the East Pasture, the southern portions would probably be most affected, because of the reduced salinities in soils and groundwater. Grazing and management pressure is already considerably lower in the West Pasture, and, so, therefore, the response to closing of the dairy would not be expected to be as dramatic. At some point in the future, grasslands within the Project Area may undergo yet another change as nutrient pools within soils are reduced to levels more characteristic of non-agricultural lands. These communities are likely to be ones supporting a combination of both native and non-native species, as

currently already occurs in the very northern portion of the East Pasture that is no longer actively managed and supports non-native forage species such as bentgrass (*Agrostis stolonifera*), as well as impressive numbers of the native grass species meadow barley (*Hordeum brachyantherum*). However, with the exception of perhaps the establishment of wildrye (*Leymus triticoides*) in more saline areas, native-dominated grasslands would be unlikely to establish naturally in wet conditions due to the overwhelming number of non-native hydrophytic grass species that dominate most grassy wetland areas in California.

Despite problems with reduced grazing and nutrient-enriched soils, a minor decrease in non-native vegetation communities would still be expected over the long-term under Alternative A, although issues associated with conversion from agricultural to non-agricultural conditions would mean that improvements over the short-term (~10-15 years) would be more negligible. The considerable proportion of non-native vegetation communities already present in the Giacomini Ranch under baseline conditions means that most of the potential spread in weedy, ruderal species would occur in areas already dominated or co-dominated by non-natives. Simultaneously, the small wetland restoration component, combined with discontinuation of agricultural management and lower intensity of grazing should grazing occur, would allow a small expansion of native vegetation communities, resulting in an approximately 11 percent decrease in the extent of non-native vegetation communities relative to baseline conditions.

Wetland and Riparian Resources: The wetland restoration component would expand Tidal Salt Marsh habitat by approximately 11.4 acres, with at least 11 acres of mid-marsh and 0.4 acres of high marsh proposed. Lower elevation Tidal Salt Marsh or low marsh, may establish in the very northern end of the East Pasture Old Slough, which would be re-opened to tidal action, and could potentially be colonized by species of local concern such as Pacific cordgrass (*Spartina foliosa*). Riparian habitat would be expected to expand naturally with a reduction in grazing and levee and creek maintenance, particularly in areas where the Seashore established riparian setbacks if leased grazing was allowed. Within the West Pasture, riparian habitat would most likely increase along the upstream portions of Fish Hatchery Creek, as well as along the pasture's perimeter where groundwater flow from the Inverness Ridge creates optimal conditions for riparian growth. Other communities such as Wet Meadow and Freshwater Marsh would also potentially expand in the East Pasture, as well, with elimination of frequent ditching that act to drain many of the pastures and limit the extent of these communities. In northern portions of the Project Area, the slow, steady reversion to Diked Brackish Marsh communities would be expected to continue.

While the Giacomini Ranch is considered by most passers-by as primarily pastureland, most of the ranch is wetland subject to jurisdiction or oversight by the Corps, the CCC, and Park Service directives. Approximately 490 acres of Corps' jurisdictional wetlands and another approximately 47 of jurisdictional waters or unvegetated aquatic areas already exist within the 613-acre Project Area. Under the No Action Alternative, there would be approximately 0.46 acres of permanent impacts to wetlands from construction of the new levee separating the wetland restoration component from the rest of the East Pasture. However, removal of the East Pasture Lagunitas Creek levees would create 0.86 acres of wetlands, resulting in a minor net gain of 0.4 acres. As discussed earlier, further expansion of wetlands would be expected from more passive means of restoration related to discontinuation of ditching practices that have drained wetland areas on the perimeter of the Giacomini Ranch. If this alternative was selected, a Statement of Findings would need to be prepared in accordance with Park Service policy, because more than 0.25 acres of wetlands would be adversely impacted: a Statement of Findings for the preferred alternative can be found in Appendix D.

Elimination of levees and discontinuation of irrigation during the summer might have very negligible adverse impacts on the extent of wetlands, but, due to the already very wet conditions, irrigation appeared to primarily extend the length of time that good foraging conditions exist rather than increase the extent of wetlands. Levees also do not appear to have artificially increased the extent of wetlands relative to what would exist without levees through impoundment of waters. Negligible adverse effects on these communities may occur during construction from stockpiling of excavated sediments, but BMPs would be instituted to minimize construction impacts. These are discussed in more detail under Chapter 2. Overall, construction would be expected to have adverse negligible effects from temporary stockpiling, while short-term and long-term effects would be considered minor beneficial, because there would be a net gain of at least 0.4 acres.

There would be no direct project impacts to riparian habitat, although, as alluded to earlier, riparian habitat may expand naturally under the No Action Alternative due to elimination of grazing under open space land uses or reduction in grazing intensity and riparian setbacks if leased grazing is permitted.

Long-Term Changes: The effect of sea level rise under the No Action Alternative is hard to predict. Recently published studies suggest that sea level may be rising at a much higher rate than originally, with water levels

possibly rising as much as 3 feet by 2100 (Overpeck et al. 2006). Levees should preclude waters from inundating the East and West Pasture, but if there are breaches during storms or should tidal currents begin to further erode levees, these areas could become subject to tidal inundation. The projected rate of sea level rise could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions to intertidal emergent wetland communities. The effects of sea-level rise could be compounded over the long-term by continued deterioration of the levees, which would not be maintained under this alternative.

Changes in the extent of riparian habitat would also potentially occur in Olema Marsh under the No Action Alternative. A large stand of Forested Riparian habitat borders Olema Marsh, a large Freshwater Marsh impoundment dominated by tall emergent marsh species such as cattails (*Typha* sp.) and tules (*Scirpus* or *Schoenoplectus californicus* and *S. acutus*). Unlike the Giacomini Ranch, vegetation communities with Olema Marsh are exclusively native ones, which attest to the low "invasibility" potential of certain vegetation communities such as Freshwater Marsh (particularly areas dominated by medium- and tall emergent plant species) and established riparian communities. Conversely, the grassland that borders Olema Marsh to the east on the shutter ridge created by movement of the San Andreas Fault is dominated entirely by Non-Native Dry Grassland vegetation communities.

During recent years, water levels within Olema Marsh appear to be rising as a result of poor drainage from the marsh caused by a number of factors, including blockage of the western culvert by sedimentation, low capacity of the eastern culvert relative to the increased volume of flow now being directed to this culvert, and a small berm from a past fill event that acts as a funnel, limiting outflow, near the eastern culvert outlet (KHE 2006b). These drainage problems may have increased water surface levels as much as 6 feet since the early 1990s, and water surface levels are currently 4 feet above the eastern culvert invert (KHE 2006b). Increasing water levels appear to be expanding the extent of Freshwater Marsh at the expense of Forested and Scrub Shrub Riparian Habitat, with a ring of dead trees evident on the outer perimeter of the marsh adjacent to the riparian vegetation. Under the No Action Alternative, water surface levels would potentially continue to rise, thereby increasing threats to riparian vegetation on the marsh's edge. The implications of this for wildlife habitat and use are addressed under Fish and Wildlife Resources.

Special Status Plant Species: Most of the special status species that occur or have to potential to occur in the Project Area are wetland- or riparian-associated species. At least five special status species have been documented either in the Project Area or immediate vicinity, and all of these are Tidal Salt Marsh or Tidal Brackish Marsh associates, including Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*), salt marsh owl's-clover (*Castilleja ambigua* ssp. *ambigua*), Lyngbye's sedge (*Carex lyngbyei*), and Pacific cordgrass (*Spartina foliosa*). None of these species are listed as endangered, threatened or rare by either the USFWS or CDFG, but they have been designated as Species of State or Local Concern by the regional USFWS office or by CNPS. Three of these species are annual plant species from the same plant family (Scrophulariaceae) that occur between the mid- and high marsh intertidal marsh zones of undiked marshes. As with many annuals, these species respond positively to moderate or intermediate levels of disturbance from storm events or wrack deposition that create gaps in the vegetation canopy and often show wide fluctuations in numbers between years or groups of years such as a drought cycle in response to variable environmental conditions. Continued viability of these populations often relies on a long-lived seed bank, which has been shown for other species of bird's-beak to persist up to 100 years.

Two other species of concern, Lyngbye's sedge and Pacific cordgrass, are perennial grass or sedge species that occur in the lower elevations of Tidal Brackish Marsh and Tidal Salt Marsh, respectively. The Point Reyes region represents the southern extent of the known range for Lyngbye's sedge. Pacific cordgrass has become a plant of strong local concern, because of the accidental introduction and subsequent rapid invasion by and hybridization with its Atlantic and Gulf Coast counterpart, Atlantic cordgrass (*Spartina alterniflora*). Until 1993, the native cordgrass was not known to occur in Tomales Bay, however, since that sighting during the feasibility study for the proposed project, it has expanded rapidly throughout the Project Area and southern Tomales Bay.

These plants do not occur in the Project Area within diked marsh areas, although Humboldt Bay owl's-clover has established on the tidal marsh fringe or shelf on the outboard of both the West and East Pasture levees. Under the No Action Alternative, there would be only a minor expansion of undiked marsh habitat, with restoration of the 11-acre wetland as part of the Park Service's existing mitigation agreement with CalTrans.

Ostensibly, this restoration component would increase potential habitat for all of these species, with the exception of perhaps Lyngbye's sedge, because low, mid-, and high marsh habitat would be restored. However, not all salt marsh habitat has the equivalent potential to support these special status species. Most salt marsh species are restricted to specific intertidal zones or even to microtopographic habitats within these zones. Within the Project Area, Humboldt Bay owl's-clover appears to occur at a slightly lower microtopographic intertidal zone than Point Reye's bird's-beak that differs only by an inch or two. However, in terms of absolute elevation, Humboldt Bay's owl's-clover appeared to occur within a broad range of elevations from 4 to 6 feet NAVD88 in the Project Area, suggesting that other factors influence establishment and persistence of this species such as frequency of tidal inundation, gaps in vegetation canopy, etc. Therefore, it is difficult to predict whether the restored wetland would be colonized by these species, but the proximity to established populations does considerably increases the potential for establishment to occur. Indeed, removal of levees either as part of construction or because of deterioration due to lack of maintenance has the potential to have a minor adverse effect on existing occurrences, because plants occur on the tidal marsh fringe on the outboard (or outside) of that levee. For potential losses associated with construction, appropriate BMPs would be employed to minimize impact to special status species as discussed in Chapter 2.

Invasive Plants: Under the No Action Alternative, the Seashore would implement some of the established invasive plant management programs within the Project Area, targeting some of the highest priority species. Invasive plant species represent a select subset of largely, although not exclusively, non-native species that are believed to represent some of the worst threats to viability and persistence of native vegetation communities and functions played by these communities for wildlife. For the proposed project, the list of invasive species was determined by consulting the list of high, medium, and low priority invasive species for eradication that is published by the California Invasive Plant Species Council (CalIPPC), as well as the Exotic Plant Management Program already operating within the Seashore and north district of the GGNRA. Species proposed to be removed under the No Action Alternative include cape ivy (*Delairea odorata*) and pampas grass (*Cortaderia selloana*). The areal extent of these species within the Project Area is very low (~0.4 acres) and restricted to riparian habitat along Sir Francis Drake Boulevard and one small clump on the Tomasini Creek levee in the East Pasture. This alternative would completely eradicate occurrence of these species within the Project Area, but would have an overall minor effect on the total acreage of invasive plant species within the Project Area, reducing it by only 1.3 percent.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: The No Action Alternative would either have either no cumulative impact or very negligible cumulative impact with other projects proposed in the local community, Seashore, coastal Marin, or San Francisco Bay region.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of the No Action Alternative on vegetation and wetland resources in the Project Area would generally range from minor adverse to minor beneficial (Table 64). The only active changes under this alternative would be an 11-acre wetland restoration component that is required under the Park Service's existing mitigation agreement with CalTrans, reduction in intensity or elimination of grazing, and the discontinuation of agricultural management practices that appear to have had negative effects on native vegetation communities, wetlands, riparian habitat, and special status species.

Under this alternative, the Giacomini Ranch would largely remain grassland, although it would change in nature due to the elimination of grazing or reduced grazing intensity and the elimination of intensive agricultural management practices. Depending upon a number of factors, including future grazing intensity, nutrient concentrations in soils, and influence of salts through surface waters or groundwater, this response would vary spatially. A large proportion of the pastures could respond to reduced grazing and management with a rapid increase in vegetation biomass and plant height, particularly of weedy, ruderal species such as common velvet grass and milk thistle that are well-adapted to nutrient-enriched soils and changes in environmental conditions. The extent and intensity of this response would be governed by nutrient and salt

concentrations of soils, with the most visible changes occurring in areas with high nutrients and low salts such as the southern end of the East Pasture.

Despite this, there would be a minor decrease in non-native vegetation communities expected under this alternative, at least over the long-term, probably because most of the areas that would have a higher potential to support weedy species are already dominated by non-natives. Negligible to minor increases in native-dominated wetland and riparian vegetation communities would occur in the Giacomini Ranch, because of the 11-acre wetland restoration component, the reduced grazing pressure on riparian habitat, and the expansion of Wet Meadow and Freshwater Marsh communities with the elimination of frequent ditching to drain pastures. Negligible adverse effects on these communities may occur during construction from stockpiling of excavated sediments, but BMPs would be instituted to minimize construction impacts. Overall, construction would be expected to have adverse negligible effects from temporary stockpiling, while short-term and long-term effects would be considered minor beneficial, because there would be a net gain of at least 0.4 acres. In Olema Marsh, which would not be restored under the No Action Alternative, decreases in riparian habitat would continue to occur from what appears to be steadily increasing water levels over the last decade due to poor drainage through undersized culverts.

There would also be potentially minor beneficial effects on the salt marsh-associated special status plant species that already occur in the Project Area in close proximity to the restored wetland, as well as negligible beneficial effects on invasive plant species through eradication of some of the highest priority species within the Seashore (cape ivy and pampas grass). At some point in the future, grasslands within the Project Area may change yet again to communities dominated by both native and non-native species once nutrient pools within soils are reduced to levels more characteristic of non-agricultural lands. However, with the exception of perhaps more saline areas, native grasslands would be unlikely to establish naturally in these types of wet conditions due to the overwhelming number of non-native hydrophytic grass species that dominate most grassy wetland areas in California.

Alternative A

Analysis: The effects of Alternative A on vegetation and wetland resources in the Project Area would generally range from major adverse to major beneficial (Table 64). Major and substantial impacts that would be significant under CEQA would be mitigated to less than significant under CEQA and moderate under NEPA. Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh, although there would the potential in the future for an extension of the southern perimeter trail to Inverness Park. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile and actively revegetated with riparian vegetation. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

Relative to the minor effects that discontinuation of agricultural management practices had on vegetation resources under the No Action Alternative, Alternative A would have moderate to major beneficial effects on native vegetation communities, wetlands, riparian habitat, and special status species in the Giacomini Ranch, largely because of the removal of agricultural infrastructure and reestablishment of hydrologic connectivity between the East Pasture and Lagunitas Creek and the southern portion of Tomales Bay. In Olema Marsh, where there is no agricultural use, conditions would be expected to remain fairly similar to the No Action Alternative, where negligible to minor losses or dieback of riparian habitat might occur due to increased water levels and expansion of the Freshwater Marsh.

Vegetation Communities: The largest single change under Alternative A comes from the substantial conversion of grasslands to brackish and salt marsh with reintroduction of tidal action through both breaching of levees and reconnection and expansion of the historic slough (East Pasture Old Slough) that had been ditched and straightened once the marsh was leveed. Approximately 100-150 acres of Tidal Salt Marsh would be expected to establish in the lowest elevation portions of the East Pasture at its northern end, with salt marsh distribution dictated to some degree by proximity to tidal channels or creeks such as Lagunitas Creek and the East Pasture Old Slough. Higher elevation areas, areas further from tidal channels or creeks, and

areas receiving more freshwater influence from flooding of Lagunitas Creek during the winter or from seasonal to perennial emergent groundwater sources on the Point Reyes Mesa would remain brackish in nature.

Brackish communities, particularly low-growing ones that occur in diked areas, often closely resemble Tidal Salt Marsh, as they support many of the same suite of halophytic or salt-tolerant species such as saltgrass (*Distichlis spicata*), pickleweed (*Salicornia* or *Sarcocornia virginica*), jaumea (*Jaumea carnosa*), and alkali heath (*Frankenia salina*), along with species that are characteristic of primarily brackish areas such as fat-hen (*Atriplex triangularis*). However, low-growing, infrequently flooded brackish communities are usually more susceptible to invasion by non-native species such as brass buttons (*Cotula coronopifolia*), annual beard-grass (*Polypogon* spp.), birdfoot trefoil (*Lotus corniculatus*), loosestrife (*Lythrum hyssopifolia*), and curly dock (*Rumex crispus*). Within diked areas, these species can be persistent, but they also often occur as transitional species when tidal influence is reintroduced, because of their propensity to establish and expand rapidly under disturbance conditions and their tolerance of moderate salinities.

These non-native brackish species would be expected to move into much of the East Pasture that is influenced by tides for some period of time, as the salts in tidal waters slowly kill off the non-salt-tolerant – or at least less salt-tolerant – pasture grasses and convert grassland into marsh. This dynamic would minimize the conversion from non-native to native communities over the short-term, leading to only potentially a negligible beneficial effect during this timeframe. The rate at which more native salt marsh vegetation communities begin to establish within the East Pasture probably depends on a number of factors. Based on vegetation surveys in the West Pasture, conversion to salt marsh appears to take place more rapidly in areas adjacent to tidal channels. Repair of the tidegate on Fish Hatchery Creek in the West Pasture levee appears to have resulted in a minor increase in tidal inflow, which has some effect on the distribution of salt and/or brackish marsh habitats what was once ruderal marsh and grassland habitat in the portion of the West Pasture nearest the tidegate. Elongation of a remnant tidal marsh creek near the tidegate in response to increased tidal influence has strongly dictated the pattern of salt marsh and/or brackish marsh establishment, with these habitats appearing to almost radiate outward from the creek. More distant, less frequently tidally inundated areas, conversely, support an abundance of non-native brackish marsh species such as brass buttons and annual beard grass amidst some native salt marsh species.

Frequent tidal inundation likely increases the salt content of soils above that tolerated by some of the brackish species. The rate of establishment of native salt marsh vegetation communities will also depend on climatic cycles, with wet or high-precipitation years perhaps favoring persistence of brackish marsh non-natives. In 2006, which was characterized by a series of moderately sized to large floods, curly dock (*Rumex crispus*) suddenly appeared in the undiked salt marsh north of the Giacomini Ranch in much larger than normal numbers, probably in response to fresher or less saline surface water conditions.

Within 10-20 years, then, predominantly native vegetation communities would be expected to replace non-native vegetation communities characteristic of brackish conditions in those lowest elevation areas that are close to creeks and frequently inundated by tides. At higher elevations that are less frequently inundated by tides and more subject to freshwater influence from groundwater or run-off, communities that are more characteristic of disturbed conditions would be expected to persist for some time. These disturbance-adapted communities would be further promoted by the high nutrient concentrations present in the former dairy pastures due to high grazing intensities and practices such as manure spreading. Nutrient concentrations probably are highest in the southern portion of the East Pasture, where elevations are highest, tidal influence would be least, and disturbance from overbank flooding of Lagunitas Creek would be highest. A more complete description of this issue can be found under the No Action Alternative. Species within these brackish vegetation communities would probably consist of a diverse variety of species, including brass buttons, annual beard's grass, fat hen, curly dock, bent grass, ryegrass, and other moderately salt tolerant grasses and forbs.

Within the West Pasture, where no restoration would be performed, conditions would remain similar to those described for the No Action Alternative, with the exception that there would be no grazing. Vegetation communities in the southern portions of the West Pasture and the western perimeter would largely remain unchanged, however, in the northern portion, salt marsh and/or brackish communities would continue to expand into areas directly adjacent to the north levee and the northern portion of the freshwater marsh, as is already occurring under baseline conditions. Grazing removal would favor natural expansion of riparian habitat along Fish Hatchery Creek and the western perimeter where groundwater flow creates optimal conditions for riparian vegetation.

Hauling of excavated sediments to quarries in the Tomales or Pierce Point area would not be expected to have any long-term effect on native vegetation communities. Most of these quarries are serviced directly by roads.

One of the quarries would require crossing through a pasture dominated by pastoral herbs and forbs, as well as scattered patches of native grasses, herbs, and shrubs, including some wetland and rare plant areas (see more detailed description below). Short-term effects would be expected to be negligible adverse, because the Park Service would institute construction BMPs to ensure that rare plants and, to the extent possible, wetlands are not impacted (see Chapter 2).

Wetland and Riparian Resources: Similar to the No Action Alternative, riparian habitat and, along certain portions of the ranch perimeter, freshwater wetland communities such as Wet Meadow and Freshwater Marsh would be expected to expand slightly in response to removal of grazing and the discontinuation of frequent ditching that was performed to drain pastures. These passive restoration components would combine with the more active restoration components of levee breaching, road removal, excavation of concentrated manure disposal, and removal of spoil piles to have a major beneficial effect on wetlands in the Project Area. Approximately 490 acres of Corps' jurisdictional wetlands and another approximately 47 of jurisdictional waters or unvegetated aquatic areas already exist within the 613-acre Project Area.

While Alternative A would involve at least 0.27acres of wetland loss from construction of a culverted berm trail on the eastern perimeter of the East Pasture adjacent to Tomasini Creek and the Point Reyes Mesa bluff, the passive and active restoration components would result in an increase of approximately 9.2 acres for a net gain of 8.9 acres. Over the long-term, this gain would represent a major beneficial effect. Construction of the eastern perimeter trail would also require approximately another 0.2 acres of temporary impacts from removal of riparian vegetation, with these losses negatively affecting the ability of this habitat to function in water quality improvement and dissipation of flood flow energy of Tomasini Creek until vegetation can re-establish. Activities within wetlands would require permits from the Corps under Section 404 of the CWA, the CCC under the federal Coastal Act, and the RWQCB under Section 401 of the CWA (see Chapter 5 for more information). Because losses exceed 0.25 acres, if this alternative was selected, a Statement of Findings would need to be prepared in accordance with Park Service policy: a Statement of Findings for the preferred alternative can be found in Appendix D.

There may also be permanent fill of wetlands associated with the potential future extension of the southern perimeter trail to Inverness Park through possible widening of the Sir Francis Drake Boulevard road berm. The level of impact with berm widening would vary depending on final design, but impacts would be expected to minor to moderate unless the trail was placed instead on a boardwalk through the West Pasture. Within the East Pasture, there would be some major conversion of wetland types such that ditches would be filled to create emergent marsh, but at least 4.3 acres of new tidal channels with a planform or morphology more characteristic of natural marshes would be excavated to increase tidal influence into the interior of the pasture. Minor adverse effects on these communities may occur during construction from stockpiling of excavated sediments and from hauling of excavated sediments to quarries to one of the quarries in the Tomales or Pierce Point area would have the potential for some construction-related effects on wetlands. If the western route to the McClure DG is used, temporary impacts to wetlands could total up to 0.06-acre. Where possible, impacts would be avoided by staging construction areas in uplands or carefully routing truck traffic, however, if this is not possible, impacts would be reduced through construction-related BMPs. These are discussed in more detail under Chapter 2.

Construction of the eastern perimeter trail would not only affect wetlands, but riparian habitat that is subject to oversight by both the CCC under the Streamside Conservation Areas (SCA) established under the LCP for Zone II and the Point Reyes Mesa bluff protection policies outlined in the Point Reyes Station Community Plan (see discussion earlier in this section). Approximately 0.54 acres of the riparian habitat would be permanently impacted by construction of the culverted berm, with another 0.34 acres temporarily impacted through removal of riparian vegetation for trail construction. In addition, riparian habitat in the West Pasture could possibly be impacted by the potential future extension of the southern perimeter trail, as berm widening would not only affect wetlands, but would require removal of riparian habitat. For the latter, placement of the trail on a boardwalk in the West Pasture would eliminate these potential impacts.

While the construction of the eastern perimeter trail would impact less than 1 acre, it would potentially violate state and local policies regarding protection of riparian resources. Under the LCP, no development or vegetation removal is permitted within the SCA unless no alternatives are feasible. Alternatives for construction of an eastern perimeter trail are limited. One of the few other options would be to construct the trail on the berm separating Tomasini Creek from the East Pasture, but this berm is in bad condition from erosion and lack of maintenance, and construction and maintenance of a trail on the berm was considered to have more of a potential impact on natural hydrologic and ecological processes and functions than

constructing a trail on the railroad grade. The only other option would be to not construct the through-trail component at all, which is evaluated under Alternatives C and D.

In addition to LCP policies, construction of the eastern perimeter trail would potentially violate the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) protection objectives regarding the Point Reyes Mesa bluff, including "preservation of the physical, ecological, and visual integrity of the bluff area located above the old railroad right-of-way through the development review process establishment of a 100-foot buffer zone extended eastward from the eastern edge of the railroad grade." Construction of the trail would potentially violate the ecological integrity of the bluff area. Therefore, while impacts would total less than 1 acre, potential violation of LCP and Point Reyes Station Community Plan policies would constitute a major or substantial impact and a significant impact under CEQA. These impacts would be mitigated to moderate levels under NEPA and less-than-significant levels under CEQA through active and passive restoration of riparian habitat in other Streamside Conservation Areas, including Lagunitas Creek and Fish Hatchery Creek. Because this area is on federal lands, CDFG jurisdiction would not apply.

Over the long-term, some of these impacts would be offset by increases by both passive and active restoration of riparian habitat. Under Alternative A, active riparian revegetation of the southwestern corner would be conducted on the East Pasture creek bank after being regraded to a more stabile profile. Passive riparian restoration would be expected to occur along the upper portions of Fish Hatchery Creek, where a stand of young arroyo willows (*Salix lasiolepis*) and red alders (*Alnus rubra*) are already beginning to establish. As a result of passive and active restoration, riparian habitat would increase by as much as 3.2 acres for a net gain of 2.5.

Long-Term Changes: Over the next 100 years, a net increase in wetlands and a subtle shift in wetland types could occur if sea levels rise as dramatically as has been recently projected. Recently published studies suggest that sea levels may be rising at a much higher rate than originally predicted, with water levels now predicted to rise as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88, converting to intertidal emergent wetlands to subtidal and intertidal unvegetated habitats, and a shift upwards in the extent of areas subject to tidal inundation, thereby increasing wetland habitat and decreasing upland or grassland habitat within the Project Area.

Special Status Species: As discussed under the No Action Alternative, most of the special status species that occur or have to potential to occur in the Project Area are wetland- or riparian-associated species, although there are a few non-wetland species in the vicinity of the quarry access route to the McClure DG quarry. At least five wetland species have been documented either in the Project Area or immediate vicinity, and all of these are Tidal Salt Marsh or Tidal Brackish Marsh associates, including Point Reyes bird's-beak, Humboldt Bay owl's-clover, salt marsh owl's-clover, Lyngbye's sedge, and Pacific cordgrass. These plants do not occur in the Project Area within diked marsh areas, although Humboldt Bay owl's-clover has established on the tidal marsh fringe or shelf on the outboard or outside of both the West and East Pasture levees. None of these species are listed as endangered, threatened or rare by either the USFWS or CDFG, but they are designated as Species of State Concern by CNPS and/or were formerly designated as Species of Regional Concern by the Sacramento USFWS office.

Because this alternative would be expected to have major beneficial effects on Tidal Salt Marsh and Tidal Brackish Marsh, it would also be expected to have major beneficial effects on the potential for special status plant species to expand in areal extent and numbers. This alternative would create more than 300 acres of salt and brackish marsh habitat. As was noted under the No Action Alternative, not all salt marsh habitat has the same potential to support these special status species. For this reason, it is difficult to predict whether the restored wetland would be colonized by these species, but the proximity to established populations does considerably increases the potential for establishment to occur. As with the No Action Alternative, breaching of the East Pasture levees would have the potential to have a minor adverse effect on existing species status plant species occurrences, because Humboldt Bay owl's-clover occurs on the tidal marsh fringe on the outboard of that levee. Appropriate BMPs would be employed to minimize impact to special status species as discussed in Chapter 2.

A number of special status species have been mapped in the area of the pasture that would be used as an access route to the McClure DG. The species that have been recorded on or directly adjacent to the established access routes or within what would be potential stockpiling and staging area for the quarry are: woolly-headed spineflower (*Chorizanthe cuspidata var. villosa*; CNPS List 1B.2), Blasdale's bent grass (*Agrostis blasdalei*, SR, former FSacSC, CNPS List 1B); Point Reyes blennosperma (*Blennosperma nanum* var.

robustum, CNPS List 1B.2), Michael's reign orchid (*Piperia michaelii*, former FSacSC, CNPS List 4.2), Mountain phlox (*Leptosiphon grandiflorus*, CNPS List 4.2), and Point Reyes ceanothus (*Ceanothus gloriosus* var. *gloriosus*, CNPS List 4.3). CNPS List 4 species are not considered endangered, but are of limited distribution.

The eastern and west established approach routes to the quarry cross through wetlands and several large patches of woolly-headed spineflower and Blasdale's bent grass. In addition to the temporary wetland impacts discussed earlier, hauling could potentially impact 0.2 acre of Blasdale's bent grass and 0.09 acre of woolly-headed spineflower. Hauling would typically occur after the reproductive season for these species, which would minimize impacts to some degree. Based on timing of hauling and total amount of habitat impacted, hauling could have the potential for negligible to minor impacts on plants and a moderate short-term impact on habitat of these species, because topsoils would not be stockpiled and replaced. These impacts could be minimized by 1) creating a new approach at the mouth of the quarry for the western access route that would avoid the Blasdale's bent grass occurrence; 2) collecting seed from woolly-headed spineflower plants growing in the access route before hauling begins and storing seed for dispersal once hauling and other construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road. In addition, other appropriate BMPs may be implemented such as discussed under Chapter 2.

Invasive Plants: Under Alternative A, the Seashore would expand invasive plant removal efforts to target approximately 5 acres of Himalayan blackberry in addition to cape ivy and pampas grass. Invasive plant species represent a select subset of largely, although not exclusively, non-native species that are believed to represent some of the worst threats to viability and persistence of native vegetation communities and functions played by these communities for wildlife. For the proposed project, the list of invasive species was determined by consulting the list of high, medium, and low priority invasive species for eradication that is published by the California Invasive Plant Species Council (CalIPPC), as well as the Exotic Plant Management Program already operating within the Seashore and north district of the GGNRA. Himalayan blackberry would be removed from the southern portion of the East Pasture levee or creek bank, as well as from the small hillslope below the dairy facility on the mesa. This alternative would completely eradicate cape ivy and pampas grass within the Project Area and would remove approximately 31 percent of the Himalayan blackberry within the Project Area. Overall, it would have a minor effect on the total acreage of invasive plant species within the Project Area, reducing it by 16 percent.

Proposed Mitigation Measures: Construction of the eastern perimeter trail would potentially cause a violation of state and local policies regarding protection of riparian resources and was, therefore, considered to have major or substantial effect under NEPA and a significant impact under CEQA. Because no alternatives exist that would avoid impacts to riparian habitat (other than eliminating construction of a through-trail – see Alternatives C and D), impacts to riparian habitat in a SCA would be mitigated to at least moderate levels under NEPA and a less-than-significant level under CEQA through active and passive restoration of riparian habitat in other SCAs, including Lagunitas Creek and Fish Hatchery Creek. These restoration efforts would result in establishment of at least 3.2 acres of riparian habitat in SCAs, resulting in a net gain of 2.5 acres. In addition, to ensure that invasive or weedy species from the Project Area do not become established within the quarry area, tires of trucks hauling excavated sediment to the McClure DG would be washed prior to exiting the Project Area to remove seeds and vegetative materials that could become established elsewhere.

Effectiveness of Proposed Mitigation Measures: Implementation of the proposed mitigation measures would reduce the intensity of impacts in sensitive construction zones to less-than-significant levels under CEQA and to moderate levels under NEPA. The success of riparian establishment in higher elevations floodplains would be enhanced through active planting and irrigation, while natural recruitment would be expected to occur quickly in lower elevation floodplains. While these mitigation measures would satisfactorily address LCP policies by causing a net gain in other SCAs, they would have only marginal success in mitigating conflicts with the Point Reyes Mesa Bluff protection policies, because natural recruitment along areas that are not already vegetated would not be expected to readily occur.

Cumulative Impacts: There are a number of projects that would have cumulative beneficial effects should Alternative A be implemented. The closest and most direct cumulative impact would come from the Bear Valley Creek Watershed Enhancement Project. The Bear Valley Creek proposes to replace failing or underperforming hydrologic infrastructure at a number of locations on Bear Valley Creek within the Seashore boundaries. There is no definitive timeframe for construction of this project, but it would be expected to benefit hydrologic and ecological processes on Bear Valley Creek and thereby have a cumulatively beneficial effect on Olema Marsh. Within the Tomales Bay watershed, the Tomales Bay Watershed Council with other

local groups and agencies on a proposed restoration project at Chicken Ranch Beach on the western border of Tomales Bay that would potentially increase estuarine and riverine wetlands through removal of fill that is currently dominated by non-native upland vegetation communities.

The Seashore and the GGNRA are undertaking a number of wetland and watershed restoration projects, most of which have occurred or would occur in coastal portions of the parks that adjoin the Pacific Ocean. Most of the Seashore projects are in the Drakes Estero-Limantour Estero watershed. Similar to the proposed project, these projects focus on restoring hydrologic connectivity through removal of infrastructure that constrains natural hydrologic and ecological processes and functions. Most of these projects would result in a conversion in wetland type rather than an increase in total wetland acreage, but almost all would increase the extent of estuarine wetlands such as Tidal Salt Marsh that were lost when dams and roads were constructed. Cumulatively, the proposed project, in combination with these other projects, would be expected to have a minor to perhaps even moderate beneficial effect on estuarine wetlands and wetland functioning within the coastal Marin region and a negligible beneficial effect on native vegetation communities.

On a larger San Francisco Bay regional scale, the proposed project would benefit regional distribution of rare species, including Point Reyes bird's-beak and Pacific cordgrass. The proposed project, in combination with other regional marsh restoration projects, would be expected to increase the distribution and numbers of rare species such as Point Reyes bird's-beak, which occurs in Tomales and San Francisco Bays. In addition, the proposed project will also have a cumulatively beneficial effect on efforts to eradicate non-native cordgrass and reestablish native cordgrass in San Francisco Bay. A large percentage of the Pacific cordgrass occurrences in San Francisco Bay have been extirpated by invasion of Atlantic cordgrass or the Atlantic-Pacific cordgrass hybrid. The incredible resurgence and spread of Pacific cordgrass within Tomales Bay provides a source population of native cordgrass for possible recolonization within San Francisco Bay once extensive efforts to eradicate its invasive congeners have been successful. Therefore, over the long-term, the proposed project would be expected to have negligible to minor cumulative beneficial effects with non-native removal projects and the large number of ongoing wetland restoration projects in San Francisco Bay for species such as Pacific cordgrass and Point Reyes bird's-beak.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative A on vegetation and wetland resources in the Project Area would generally range from major adverse to major beneficial. Major and substantial impacts that would be significant under CEQA would be mitigated to less than significant under CEQA and moderate under NEPA. The largest single change under this alternative relative to the No Action Alternative would come from the substantial conversion of grassland to salt and brackish marsh through breaching of the East Pasture levee, removal of agricultural infrastructure, and tidal reconnection and expansion of the historic tidal slough. Through these actions, more than two-thirds of the East Pasture would be expected to shift from grassland to marsh. These actions would result in a moderate decrease in non-native vegetation communities of approximately 30 percent over the long-term. However, a transitional period would be expected over the short-term during which, as pasturelands slowly convert through exposure to saline conditions to marsh, restored areas would be dominated by a mix of non-native opportunistic, moderately salt-tolerant species characteristic of brackish conditions such as brass buttons, annual beard-grass, loosestrife, birdfoot trefoil, curly dock, and others. These species could persist in higher elevation portions of the East Pasture that are only infrequently inundated, subject to freshwater influence from run-off or emergent groundwater, and high in residual soil nutrients because of dairy cattle grazing and manure spreading. Native-dominated salt marsh communities would eventually move into those lower elevations that are close to tidal creeks and are more frequently inundated by tides.

No restoration would occur in either the West Pasture or Olema Marsh, but some changes would still be expected. As discussed under the No Action Alternative, increased tidal influence in the West Pasture would increase the extent of salt marsh and/or brackish marsh communities in the northern portion of the West Pasture, including in the existing freshwater marsh. Grazing removal would favor natural expansion of riparian habitat along Fish Hatchery Creek and the western perimeter where groundwater flow creates optimal conditions for riparian vegetation. Riparian habitat, on the other hand, would continue to potentially decrease in Olema Marsh in response to what appears to be increasing water levels caused by poor drainage from undersized culverts and other factors. Open water and Freshwater Marsh communities would increase as a result.

Over the long-term, moderate to major beneficial effects on wetland and riparian vegetation communities would occur, because of discontinuation of agricultural management practices, elimination of grazing, and removal of agricultural infrastructure such as levee breaching, removal of tidegates, and tidal reconnection and expansion of historic sloughs. Minor adverse effects on these communities may occur during construction from stockpiling of excavated sediments, but BMPs would be instituted to minimize construction impacts. These are discussed in more detail under Chapter 2. Overall, there would be moderate adverse effects during construction temporary impact to approximately 0.25 to 0.5 acres of wetlands from construction of the eastern perimeter trail and temporary stockpiling. However, over the short- and long-term, the permanent loss of 0.27 acres from construction of the eastern perimeter trail would be offset considerably, creating a net gain of 8.9 acres. This gain would represent a major beneficial effect.

Construction of the eastern perimeter trail would result in a 0.34-acre temporary impact and permanent losses of 0.54 acre of riparian habitat within a SCA. While impacts would total less than 1 acre, potential violation of LCP and Point Reyes Station Community Plan policies would constitute a major or substantial impact under NEPA and a significant impact under CEQA. These impacts would be mitigated to at least moderate levels under NEPA and less-than-significant levels under CEQA through establishment of 3.2 acres of riparian habitat in other Streamside Conservation Areas, including Lagunitas Creek and Fish Hatchery Creek, through passive and active restoration, thereby resulting in a net gain of 2.5 acres.

There would also be major beneficial effects on the salt marsh-associated special status plant species that already occur in the Project Area in close proximity to the restored wetland, although minor adverse effects may occur during construction due to impacts to occurrences adjacent to removed levees. Based on timing of hauling and total amount of habitat impacted, hauling could have the potential for negligible to minor impacts on plants and a moderate short-term impact on habitat of these species, because topsoils would not be stockpiled and replaced. These impacts could be minimized by 1) creating a new approach for the western access route to avoid Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road. Minor beneficial effects would be expected on extent on invasive plant species through eradication of cape ivy, pampas grass, and Himalayan blackberry.

Alternative B

Analysis: The effects of Alternative B on vegetation and wetland resources in the Project Area would generally range from major adverse to major beneficial (Table 64). Major and substantial impacts that would be significant under CEQA would be mitigated to less than significant under CEQA and minor under NEPA. Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. The whole southern East Pasture creek bank would be restored through removal of rip-rap bank stabilization and regraded.

Relative to the moderate effects that discontinuation of agricultural management practices, removal of agricultural infrastructure, and minor restoration actions have on vegetation resources under Alternative A, Alternative B would have major beneficial effects on native vegetation communities, wetlands, riparian habitat, and special status species in the Giacomini Ranch, largely because of the complete removal of the East Pasture and breaching of the West Pasture Levee. In Olema Marsh, where there is no agricultural use, conditions would be expected to remain fairly similar to the No Action Alternative, where negligible to minor losses or dieback of riparian habitat might occur due to increased water levels and expansion of the Freshwater Marsh.

Vegetation Communities: Under Alternative B, the areal extent of salt marsh vegetation communities would expand dramatically in relation to the extent of grassland communities under baseline conditions and the No Action Alternative and brackish marsh and wet non-native grassland communities under Alternative A. Tidal Salt Marsh, including mid-, high, and high/upland ecotone communities, would be expected to cover more than 60 percent of the East Pasture, extending up to the maximum intertidal elevations with conversion from pasture to marsh promoted by an expanded tidal channel network. Within channels, intertidal and subtidal conditions would occur, with low marsh zones colonized either by Pacific cordgrass nearest the mouth and

alkali bulrush (*Scirpus* or *Schoenoplectus maritimus*) in the interior. Dry non-native grassland would establish at the highest elevations in the southern portion of the East Pasture, well above intertidal elevations but frequently disturbed by overbank flooding with flood frequency to increase to 2-year flood events. Brackish marsh communities consisting of sparsely vegetated mudflats would continue to persist in the northeastern portion of the East Pasture at the very lowest elevations, supported by continued muted tidal inflow from Tomasini Creek and ponding of surface freshwater run-off. The extent of Freshwater Marsh would increase in the East Pasture with excavation of a 5.4-acre feature, the Tomasini Triangle marsh, which is expected to be inundated through mid-summer with surface run-off and emergent groundwater from the adjacent Point Reyes Mesa. The duration of ponding would be enhanced by construction of a low berm at its western edge that would limit both outflow and inflow from extreme high events, maintaining fresh salinities.

The Tomasini Triangle marsh would help to offset the continuing conversion under baseline conditions of approximately half (4.5 acres) of the marsh in the West Pasture from freshwater to brackish conditions. The other half (3.9 acres) would remain freshwater marsh due to the slightly elevated topographic elevation relative to the northern portion, the distance from Fish Hatchery Creek, and proximity to large perennial sources of freshwater, the 1906 drainage and groundwater flow emerging from the base of the Inverness Ridge. Within the West Pasture, Tidal Salt Marsh would be concentrated in the northern and eastern portions in close proximity to tidal creeks such as Lagunitas and Fish Hatchery. A relatively limited amount of brackish marsh would develop around the perimeter of Tidal Salt Marsh near the upstream extent of tidal influence during the summer and fall. However, most of the western and southern portions of the West Pasture would remain similar to baseline conditions and conditions under the No Action Alternative, with Freshwater Marsh, Wet Meadow, Forested Riparian, Scrub-Shrub Riparian, and wet non-native grassland communities continuing to persist along the ranch's boundary with the Inverness Ridge due to the abundant groundwater supply. Riparian habitat would be expected to expand naturally with the removal of grazing and discontinuation of agricultural management practices, along with some limited revegetation efforts along the upper portion of Fish Hatchery Creek.

Over the long-term, these changes would result in a major beneficial effect on native vegetation communities, decreasing the extent of non-native vegetation communities by almost 70 percent relative to the 467 acres that exist under baseline conditions. As discussed under both the No Action Alternative and Alternative A, the response would not be as dramatic over the short-term in terms of reduction in non-native communities, with only a negligible beneficial effect expected. Non-native opportunistic species characteristic of brackish conditions such as brass buttons, annual beard grass, loosestrife, and curly dock would move into areas disturbed by levee removal and breaching for some period of time, as the salts in tidal waters slowly killed off the non-salt-tolerant – or at least less salt-tolerant – pasture grasses and convert grassland into marsh. The rate at which native salt marsh replaces these transitional communities probably depends on a number of factors, including proximity to tidal channels, frequency of tidal inundation, amount of freshwater inundation, climatic cycles such as a series of very wet or high-precipitation years, and soil nutrient and salt conditions. This dynamic would minimize the conversion from non-native to native communities over the short-term, leading to only potentially a negligible beneficial effect during this timeframe.

At higher elevations that are less frequently inundated by tides and perhaps more subject to freshwater influence from groundwater or run-off, communities more characteristic of disturbed conditions would be expected to persist for some time, if not indefinitely. These disturbance-adapted communities would be further promoted by the high nutrient concentrations present in the former dairy pastures due to high grazing intensities and practices such as manure spreading. Nutrient concentrations probably are highest in the southern portion of the East Pasture, where elevations are highest, tidal influence would be least, and disturbance from overbank flooding of Lagunitas Creek would be highest. A more complete description of this issue can be found under the No Action Alternative. These factors would lead the large grassland area within the East Pasture to remain dominated by largely non-native species, although, with time, some native species may begin to be present.

Hauling of excavated sediments to quarries in the Tomales or Pierce Point area would not be expected to have any long-term effect on native vegetation communities. Most of these quarries are serviced directly by roads. One of the quarries would require crossing through a pasture dominated by pastoral herbs and forbs, as well as scattered patches of native grasses, herbs, and shrubs, including some wetland and rare plant areas (see more detailed description below). Short-term effects would be expected to be negligible adverse, because construction BMPs would be implemented to ensure that impacts to rare plants and wetlands are minimized (see Chapter 2).

Wetland and Riparian Resources: Similar to Alternative A, riparian habitat and, along certain portions of the ranch perimeter, freshwater wetland communities such as Wet Meadow and Freshwater Marsh would be expected to expand slightly in response to removal of grazing and the discontinuation of frequent ditching that was performed to drain pastures for improved grazing. These passive restoration components would combine with the more active restoration components of levee breaching and removal, tidal channel creation, freshwater marsh creation, road removal, excavation of concentrated manure disposal, and removal of spoil piles to have a major beneficial effect on wetlands in the Project Area. Approximately 490 acres of Corps' jurisdictional wetlands and another approximately 47 of jurisdictional waters or unvegetated aquatic areas already exist within the 613-acre Project Area.

While Alternative B would still incorporate a trail on the eastern perimeter of the East Pasture, wetland losses in this area would be decreased by use of a boardwalk rather than a culverted berm trail. However, at least 1.74 acres of wetlands would be filled for creation of high tide refugia for a special status bird species in the West Pasture and a low refugia berm adjacent to the created Tomasini Triangle freshwater marsh in the East Pasture. At least 0.3 acre of drainage ditches in the East Pasture would also be filled. In addition, as noted above, hauling of excavated sediments to quarries to one of the quarries in the Tomales or Pierce Point area (McClure DG) would have the potential for approximately 0.06-acre of construction-related effects on wetlands. The construction-related effects on wetlands are expected to be no more than minor adverse, because of BMPs implemented by the Park Service to avoid or minimize impacts as discussed in Chapter 2. Activities within wetlands would require permits from the Corps under Section 404 of the CWA, the CCC under the federal Coastal Act, and the RWQCB under Section 401 of the CWA (see Chapter 5 for more information). Because losses exceed 0.25 acres, if this alternative was selected, a Statement of Findings would need to be prepared in accordance with Park Service policy: a Statement of Findings for the preferred alternative can be found in Appendix D.

These losses would be offset by creation of approximately 15.8 acres of wetland through levee removal; restoration of the ranch roads; and excavation of spoil piles, berms, manure disposal areas, and upland areas, resulting in a net gain of 13.8 acres of wetlands. Construction of the eastern perimeter trail would still require approximately 0.2 acres of temporary impacts to riparian habitat from vegetation, with these losses expected to affect functionality until vegetation can re-establish, and there would be additional temporary impacts from stockpiling, with total temporary effects estimated to range from 0.25 to 0.5 acres. Overall, then, construction or temporary impacts would be moderate adverse, while over the short- and long-term, the net gain of 14.1 acres of wetlands would constitute a major beneficial effect. There may also be permanent fill of wetlands and removal of riparian habitat associated with the potential future extension of the southern perimeter trail to Inverness Park through possible widening of the Sir Francis Drake Boulevard road berm. The level of impact with berm widening would vary depending on final design, but impacts would be expected to minor to moderate unless the trail was placed instead on a boardwalk through the West Pasture.

Within the East Pasture, there would be some major conversion of wetland types such that ditches would be filled to create emergent marsh, but at least 4.6 acres of new tidal channels with a planform or morphology more characteristic of natural marshes would be excavated to increase tidal influence into the interior of the pasture. Minor adverse effects on these communities may occur during construction from stockpiling of excavated sediments, but BMPs would be instituted to minimize construction impacts.

Similar increases would occur for riparian habitat in the Giacomini Ranch through both passive and active restoration. Under Alternative B, active riparian revegetation would be conducted along the entire southern portion of the East Pasture Lagunitas Creek bank after being regraded to a more stabile profile and removal of invasive Himalayan blackberry. Unlike Alternative A, active riparian restoration would also be conducted along the upper portions of Fish Hatchery Creek to speed up reestablishment of riparian vegetation, and passive restoration would be expected to increase riparian extent along the perimeter of both the East and West Pastures. As a result, riparian habitat would increase by as much as 11 acres for a net gain of almost 10 acres.

Approximately 0.54 acres of the riparian habitat would be permanently impacted by construction of the boardwalk, with another 0.34 acres temporarily impacted through removal of riparian vegetation for trail construction. As discussed under Alternative A, these losses could potentially violate state and local policies regarding protection of riparian resources, specifically the LCP's SCA policy and the Point Reyes Station Community Point Reyes Mesa Bluff protection objective. Under the LCP, no development or vegetation removal is permitted within the SCA unless no alternatives are feasible, while the Point Reyes Station Community Plan protects the "physical, ecological, and visual integrity of the bluff area." As discussed under

Alternative A, there are few feasible alternatives for minimizing these impacts that would not either cause additional impacts to other types of natural resources or eliminating a through-trail component on the eastern perimeter, as is included in Alternatives C and D. While impacts would total less than 1 acre, potential violation of LCP and Point Reyes Station Community Plan policies would constitute a major or substantial impact under NEPA and a significant impact under CEQA. These impacts would be mitigated to minor levels under NEPA and less-than-significant levels under CEQA through establishment of at least 4 acres of riparian habitat in other SCAs, including Lagunitas Creek, Fish Hatchery Creek, and upper Tomasini Creek, thereby resulting in a net gain of at least 3.2 acres of riparian habitat in SCAs.

Long-Term Changes: Over the next 100 years, a net increase in wetlands and a subtle shift in wetland types may occur if sea levels are rising as dramatically as has been recently projected. Recently published studies suggest that sea level may be rising at a much higher rate than originally predicted, with water levels now predicted to increase as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88, converting to intertidal emergent wetlands to subtidal and intertidal unvegetated habitats, and a shift upwards in the extent of areas subject to tidal inundation, thereby increasing wetland habitat and decreasing upland or grassland habitat within the Project Area.

Special Status Plant Species: Alternative B would have very similar effects to Alternative A on special status plant species, with the intensity of effects ranging from minor adverse during construction to major beneficial following implementation. As with Alternative A, this alternative would have major beneficial effects on Tidal Salt Marsh and Tidal Brackish Marsh. Therefore, it would also be expected to have major beneficial effects on the potential for the five Tidal Salt Marsh and Tidal Brackish Marsh special status plant species to expand in areal extent and numbers. This alternative would create more than 350 acres of salt and brackish marsh habitat. Under Alternative B, the West Pasture is breached, and the East Pasture, completely removed. These actions have the potential to result in a minor adverse effect on species such as Humboldt Bay owl's-clover and Lyngbye's sedge, both of which occur on the tidal marsh fringe on the outboard of Giacomini Ranch levees. As discussed in detail under Alternative A, there is a potential for negligible to moderate impacts associated with hauling of excavated sediments to the McClure DG quarry. These impacts could be minimized by 1) creating a new approach for the western access route to avoid Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road. Appropriate BMPs would be employed in all portions of the Project Area to minimize impact to special status species as discussed in Chapter 2.

Invasive Plants: Under Alternative B, the Seashore would expand invasive plant removal efforts to target approximately 9 acres of Himalayan blackberry in addition to the cape ivy and pampas grass removal efforts proposed under Alternative A. Himalayan blackberry would be removed from the entire southern portion of the East Pasture levee or creek bank, as well as from the small hillslope below the dairy facility on the mesa. This alternative would completely eradicate cape ivy and pampas grass within the Project Area and would remove approximately 60 percent of the Himalayan blackberry within the Project Area. Overall, it would have a moderate effect on the total acreage of invasive plant species within the Project Area, reducing it by 30 percent.

Proposed Mitigation Measures: Construction of the eastern perimeter trail would potentially cause a violation of state and local policies regarding protection of riparian resources and was, therefore, considered to have major or substantial effect under NEPA and a significant impact under CEQA. Because no alternatives exist that would minimize impacts to riparian habitat (other than eliminating construction of a through-trail – see Alternatives C and D), impacts to riparian habitat in a SCA would be mitigated to minor levels under NEPA and less-than-significant levels under CEQA through active and passive restoration of riparian habitat in other SCAs, including Lagunitas Creek, Fish Hatchery Creek, and upper Tomasini Creek. These restoration efforts would result in establishment of at least 4 acres of riparian habitat in SCAs, resulting in a net gain of 3.2 acres. In addition, to ensure that invasive or weedy species from the Project Area do not become established within the quarry area, tires of hauling trucks to the McClure DG quarry would be washed prior to exiting the Project Area to remove seeds and vegetative materials that could become established elsewhere.

Effectiveness of Proposed Mitigation Measures: The effectiveness of the proposed mitigation measures would be similar to that described under Alternative A, however, because active restoration would also occur on Tomasini Creek, these measures would better mitigate conflicts with the Point Reyes Mesa Bluff protection policies, because natural recruitment in currently unvegetated areas would not be expected to

readily occur because of the high elevations and amount of disturbance. Washing tires would be moderately effective at reducing potential for establishment of invasive species.

Cumulative Impacts: As was discussed in detail under Alternative A, there are a number of projects that would have cumulative beneficial effects should Alternative B be implemented. These include the Bear Valley Creek Watershed and Fishery Enhancement Project; the Chicken Ranch Beach in Tomales Bay; and a number of wetland and watershed restoration projects in the park, Marin County, and San Francisco Bay. Most of these projects would result in a conversion in wetland type rather than an increase in total wetland acreage, but almost all would increase the extent of estuarine wetlands such as Tidal Salt Marsh that were lost when dams and roads were constructed. These projects would also increase distribution and long-term viability of certain rare species that occur in wetlands along the Marin Coast and in San Francisco Bay such as Pacific cordgrass and Point Reyes bird's-beak. Cumulatively, the proposed project, in combination with these other projects, would be expected to have major beneficial effects on estuarine wetlands and wetland functioning within Tomales Bay and the Point Reyes region and even a negligible to minor beneficial effect on native vegetation communities and rare plant species.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: Alternative B would result in major beneficial and adverse effects on vegetation and wetland resources in East and West Pastures of the Giacomini Ranch. Major and substantial impacts that would be significant under CEQA would be mitigated to less than significant under CEQA and minor under NEPA. Under this alternative, most of the grassland that exists under baseline and No Action Alternative conditions would be converted over the long-term to native salt marsh vegetation communities. Restoration would result in a decrease in non-native vegetation communities of approximately 70 percent over the long-term. However, over the short-term, changes in non-native vegetation communities would be expected to more negligible due to rapid establishment of non-native opportunistic, moderately salt-tolerant species characteristic of brackish conditions such as brass buttons, annual beard-grass, loosestrife, curly dock, birdfoot trefoil, and others during the transitional period as pasturelands slowly convert through exposure to tidal action and increased salts in water and soils. These species could persist in higher elevation portions of the pastures that are only infrequently inundated, subject to freshwater influence from run-off or emergent groundwater, and/or high in residual soil nutrients because of dairy cattle grazing and manure spreading. No restoration would occur in Olema Marsh, but the extent of riparian habitat may continue to shrink in response to what appears to be steadily increasing water levels caused by poor drainage.

Major beneficial effects on wetland and riparian vegetation communities would occur, because of discontinuation of agricultural management practices, elimination of grazing, and removal of agricultural infrastructure such as levee breaching and removal, removal of tidegates, tidal reconnection and expansion of historic sloughs, and freshwater marsh creation. Minor adverse effects on these communities may occur during construction from stockpiling of excavated sediments, but BMPs would be instituted to minimize construction impacts. These are discussed in more detail under Chapter 2. Overall, there would be moderate construction-related temporary impacts of 0.25 to 0.5 acres of wetlands from construction of the eastern perimeter trail and temporary stockpiling. However, permanent loss of 1.74 acres of wetland from construction of high tide refugia berms would be offset by passive and active restoration, resulting in a net gain of 8.9 acres.

Construction of the eastern perimeter trail would result in a 0.34-acre temporary impact and permanent losses of 0.54 acre of riparian habitat within a SCA. While impacts would total less than 1 acre, potential violation of LCP and Point Reyes Station Community Plan policies would constitute a major or substantial impact under NEPA and a significant impact under CEQA. These impacts would be mitigated to minor levels under NEPA and less-than-significant levels under CEQA through establishment of at least acres of riparian habitat in other SCAs, including Lagunitas Creek, Fish Hatchery Creek, and upper Tomasini Creek, through passive and active restoration, thereby resulting in a net gain of at least 3.2 acres in SCAs and 10 acres throughout the Project Area.

There would also be major beneficial effects on the salt marsh-associated special status plant species that already occur in the Project Area in close proximity to the restored wetland, although minor adverse effects may occur during construction due to impacts to occurrences adjacent to removed levees. As discussed in detail under Alternative A, there is a potential for negligible to moderate impacts associated with hauling of

excavated sediments to the McClure DG quarry. These impacts could be minimized by 1) creating a new approach for the western access route that would avoid the Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road. Moderate beneficial effects would be expected on extent on invasive plant species through expansion of eradication efforts on cape ivy, pampas grass, and Himalayan blackberry.

Alternative C

Analysis: The effects of Alternative C on vegetation and wetland resources in the Project Area would be similar to those of Alternative B, although there would be no potential for major adverse impacts. Effects would range in intensity from minor adverse to major beneficial (Table 64). As with Alternative B, Alternative C would have major beneficial effects on native vegetation communities, wetlands, riparian habitat, and special status species in the Giacomini Ranch, largely because of the complete removal of both the East Pasture and West Pasture levees in addition to discontinuation of intensive agricultural management practices, elimination of grazing, removal of agricultural infrastructure, and other restoration actions. In the East Pasture, the effects of this alternative would be enhanced relative to Alternative B through other restoration actions, as well, including expanded tidal channel creation, realignment of more than 60 percent of Tomasini Creek in the Project Area into one of its historic channel alignments, and scraping of weed-dominated surface soils from approximately 40 acres in the southern portion of the East Pasture. Native vegetation communities already dominate Olema Marsh, however, a minor to moderate adverse effect on these communities may occur over the short-term following construction during the process of lowering water surface levels and reestablishing new equilibrium conditions. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back relative to Alternative B through conversion of the through-trail component into two spur trails. There would also still be the potential for extension of the southern perimeter trail to Inverness Park through a separate project conducted jointly with the county

Vegetation Communities – Giacomini Ranch: Under Alternative C, the areal extent of salt marsh vegetation communities remains fairly similar to Alternative B, although it represents 24 times the amount of acreage present under baseline conditions. Similar to Alternative B, Tidal Salt Marsh, including mid-, high, and high/upland ecotone communities, would be expected to cover more than 60 percent of the East Pasture, extending up to the maximum intertidal elevations with conversion from pasture to marsh promoted by an expanded tidal channel network. Under this alternative, excavated channels convert from primarily being dominated by tidal influence to being dominated by both tidal and creek influences with realignment of Tomasini Creek into the East Pasture Old Slough, one of its historic channel alignments. Realignment may expand the influence of brackish conditions within and along the channel, creating a larger, localized zone of Tidal Brackish Marsh communities with distribution of low intertidal zone species such as alkali bulrush (*Scirpus* or *Schoenoplectus maritimus*) extending even further northward along the creek toward its mouth. Brackish marsh communities consisting of sparsely vegetated mudflats would continue to persist in the northeastern portion of the East Pasture at the very lowest elevations, supported by continued muted tidal inflow from Tomasini Creek and ponding of surface freshwater run-off.

As with Alternative B, the extent of Freshwater Marsh would increase in the East Pasture through excavation of a 5.4-acre feature, the Tomasini Triangle marsh, which is expected to be inundated through mid-summer with surface run-off and emergent groundwater from the adjacent Point Reyes Mesa. The duration of ponding would be enhanced by construction of a low berm at its western edge that would limit both freshwater outflow and tidal inflow during extreme high tide events, thereby maintaining fresh salinities. The largest single change in the East Pasture under Alternative C would occur in the grassland areas in the southern portion of the pasture. These areas, which are above intertidal elevations, would be scraped to eliminate the existing surficial weed (and nutrient) layer, and some limited revegetation would be performed to try and promote some establishment by native grasses and herbs. The difficulty in establishing native-dominated grassland without extensive maintenance would result in non-native species continuing to be present in revegetated areas, although total cover would drop relative to Alternatives A and B. Over the long-term, this grassland would remain a combination of non-native and native species, partly due to the regular disturbance expected from more frequent (2-year flood event versus 3.5-year) overbank flooding by Lagunitas Creek that sometimes favors establishment by non-native, disturbance-adapted species.

While under Alternative C, there would be changes in hydrologic processes related to higher volumes of floodwater flowing through during overbank flooding by Lagunitas Creek during storm events, the extent of

tidal inundation would remain similar to that under Alternative B, leading to few, if any changes, in expected distribution of vegetation communities relative to that alternative. As noted under Alternative B, the Tomasini Triangle marsh in the East Pasture would be created to help offset the continuing conversion under baseline conditions of approximately half (4.5 acres) of the freshwater marsh in the West Pasture from fresh to brackish conditions. The other half (3.9 acres) would remain fresh due to its slightly higher elevation; the distance from Fish Hatchery Creek; and proximity to large perennial sources of freshwater such as the 1906 drainage and groundwater flow from the Inverness Ridge. Within the West Pasture, Tidal Salt Marsh would be concentrated in the northern and eastern portions in close proximity to tidal creeks such as Lagunitas and Fish Hatchery Creeks. A relatively limited amount of brackish marsh would develop around the perimeter of Tidal Salt Marsh near the upstream extent of tidal influence during the summer and fall. However, most of the western and southern portions of the West Pasture would remain similar to baseline conditions and to conditions described for the No Action Alternative, with Freshwater Marsh, Wet Meadow, Forested Riparian, Scrub-Shrub Riparian, and wet non-native grassland communities continuing to persist along the ranch's boundary due to the abundant groundwater supply from the Inverness Ridge. Riparian habitat would expand naturally from with the removal of grazing and discontinuation of agricultural management practices, as well as from some limited revegetation efforts along the upper portion of Fish Hatchery Creek.

Vegetation Communities – Olema Marsh: Perhaps, the largest change relative to vegetation resources under Alternative C comes from restoration of Olema Marsh. Under the adaptive restoration approach, a small berm that acts as a funnel would be removed. This berm limits outflow from the marsh through its only available remaining, the eastern culvert, to Lagunitas Creek. Shallow excavation would also be performed along the flow path of Bear Valley Creek, which runs currently along the marsh's eastern perimeter, directly adjacent to the shutter ridge. Water surface levels within the marsh appear to have possibly increased as much as 6 feet since the early 1990s due to a number of factors, including elimination of drainage from the once-dominant western culvert under Levee Road due to a massive influx of sediment during the 1998 flood event (KHE 2006b). Currently, water surface levels within the marsh are consistently perched approximately 4 feet above the eastern culvert invert. These hydrologic conditions have promoted extensive establishment by Freshwater Marsh vegetation, making the Bear Valley Creek channel vegetation-choked and indistinct from the rest of the marsh. In addition, increasing water surface levels appear to be expanding Freshwater Marsh at the expense of the Forested and Scrub Shrub Riparian vegetation communities at the marsh's perimeter, with a ring of dead or dying trees evident along the marsh-riparian interface.

With implementation of the initial adaptive restoration actions, water surface levels would be expected to drop as much as 1- to 4 feet (KHE 2006b). Implementation at a later time of some of the other adaptive restoration actions could lower water surface levels another 2 feet (KHE 2006b). As waters drain down, the upper 1- to 2 feet of the marsh surface, which appear to be largely peat or undecomposed organic matter, would be dewatered and exposed to air. Through oxidation, the surface layer of these peat soils would begin to break down and decompose, causing a lowering of the marsh surface through subsidence or compaction. Subsidence rates are difficult to predict, but based on general elevations of the marsh soil surface from topographic surveys conducted, Olema Marsh could subside by as much 1-2 feet. This subsidence or compaction of soils or peat would be expected to be accompanied by an extensive die-back in tall emergent Freshwater Marsh vegetation such as cattails (*Typha* spp.), California bulrush (*Scirpus* or *Schoenoplectus californicus*), and other bulrush (*Scirpus* or *Schoenoplectus acutus*), with conditions largely becoming drier although some spatial variability would be expected in the degree of drawdown and vegetation die-back. During interim conditions, as the marsh begins to adjust to new water levels, there may be some invasion of non-native species in response to disturbance and a pulse in concentrations of soil and water nutrients from rapid decomposition of peat and organic-rich mineral soils and release of bound nutrients such as ammonium (Delaune and Smith 1985, Anisfeld and Benoit 1997, Portnoy 1999, Sommer and Horwitz 2001, Parsons and Martini-Lamb 2003).

The extent of die-back by native vegetation and invasion by non-native species would also be governed by the degree of lowering in soil pH because of the production of humic acids and other types of acids during oxidation of soils. Production of these acids even under natural conditions under summer or low tide-driven oxidation of soils often leads to a die-back of vegetation in salt marshes, creating gaps in the vegetation canopy (Cooper 1974; Mitsch and Gosselink 2000). The severity of this reduction in pH depends on the soil substrate and the degree of current or historic tidal influence. The pH in overlying waters often drops lower in saline or tidally influenced soils (pH ~2-4 with pH 7 considered normal or neutral) than in freshwater wetland or peat soils (pH ~5.0), because oxidation of pyrite and other iron-sulfur compounds in tidally influenced soils leads to extensive production of additional acidic compounds (e.g., sulfuric acid and ferrous

iron; Delaune and Smith 1985). In freshwater wetlands, acidity is primarily produced by breakdown of peat into humic acids.

The peat underlying Olema Marsh is expected to be relatively fresh or low salinity in nature, at least within surface layers, because tidal influences have been largely precluded or at least limited since construction of Levee Road in the late 1800s. However, estuarine-derived muds and peat probably underlie the peat at some unknown depth. Therefore, pHs generated by breakdown of organic matter would be expected to be closer to 5 than 2-4. The persistence of acidic conditions within overlying waters depends to a large degree on the influx rate of waters high in carbonates such as seawater, groundwater, or streams, with acids typically quickly buffered in wetlands with some consistent source of water. Low pHs typically persist for longer periods of time in systems with no to very low sources of inflowing water, because acid concentrations greatly exceed that of available carbonates. Permanent Bear Valley Creek inflow, combined with persistent subsurface groundwater inflow from the Inverness Ridge, would be expected to buffer acids within a short time of being produced, although there could be some spatial variability within the marsh where lower pHs would persist.

The reintroduction of tidal influence into Olema Marsh after many decades of absence may have other effects on vegetation. An influx of sulfates, which are naturally high in ocean waters, would occur during daily tidal flows, and these sulfates would typically be reduced in the low or no oxygen environment of wetland soils to its reduced form, sulfides. Abundant sulfides in the root zone can be extremely toxic to plants and is responsible for the poor performance of inland or high marsh plants (Hollis 1967; Mendelssohn et al. 1982) *in* Mitsch and Gosselink 2000; (DeLaune et al. 1987); Portnoy 1999). In most natural marshes, this toxicity is avoided through binding of sulfides with iron, which neutralizes its effect on plants. Tidally influenced marshes with low iron content and/or stagnant water conditions are likely to have higher sulfide concentrations within soils. Extensive die-back or poor plant colonization rates have been observed to occur in diked marshes undergoing tidal restoration that have been historically waterlogged with freshwater, because of the low levels of iron available to bind the new influx of sulfides produced from reduced sulfate (DeLaune et al. 1987; Portnoy 1999). While iron concentrations can be lower in San Francisco Bay region brackish and freshwater marshes (Goman 2005), analyses of metals within Project Area sediments showed extremely high concentrations of iron in all sediment samples high despite that some of the areas had been diked for decades and isolated from tidal influence (Parsons and Allen 2004a). Iron is naturally high in the Tomales Bay and other San Francisco Bay watershed and is detected regularly in creek and groundwater (NMWD, unpub. data). The permanent flow present in Bear Valley Creek, as well as subsurface groundwater inflow from the Inverness Ridge, would be expected to have maintained high iron concentrations in the peat despite the relative lack of tidal influence (Syrovetnik and Neretnieks 2002). These iron stores would be expected to buffer Olema Marsh against any negative effects of seawater reintroduction.

Over time, subsidence and vegetation die-back would be expected to reach some kind of equilibrium with water surface levels, but while subsidence can occur relatively rapidly, the long-term effects of drainage on sediment, water quality, and vegetation can persist for some time, with effects noted in some marshes even 10 years after marshes had been drained (Portnoy 1999). The implications for soils and water quality are discussed under the Soil Resources and Water Resources –Water Quality sections. Within the short-term, assumed to be at least 10- to 15 years for vegetation, a large degree of variability in vegetation communities would be expected in degree of die-back, extent of invasion by non-native species, and rate of recolonization by marsh species some kind of equilibrium is reached. Some of this variability would be driven by localized microtopography; the extent of tidal influence within the marsh following drainage; and the volumes and distribution of freshwater flow from Bear Valley Creek and small drainages and emergent groundwater from the Inverness Ridge on the western side of the marsh.

In the long-term, brackish communities, probably dominated by tall emergent species, would be expected to establish in approximately 10- to 20 acres in the northwestern portion of the marsh influenced by tides (KHE 2006a). Freshwater Marsh would reestablish throughout most of the rest of the marsh, with the extent dependent on the degree of drawdown in water surface levels. A larger degree of drawdown in water surface levels would promote encroachment upon the existing Freshwater Marsh boundaries by riparian habitat, thereby countering current trends and perhaps ultimately increasing acreage of riparian habitat substantially relative to its current extent. In addition, some indirect changes in riparian and marsh habitat upstream of Bear Valley Road might occur as a result of the decrease in water impoundment in Olema Marsh. Lowering of water surface levels and improvement in hydrologic connectivity within Olema Marsh would be expected to reduce backwater flooding upstream on Bear Valley Creek upstream of Bear Valley Road and potentially decrease the areal extent of marsh and/or riparian habitat. However, based on the mapped extent of marsh conditions in prior USGS topographic maps, the width of the marsh in this portion of Bear Valley Creek

appears to have been relatively constant over time and has not measurably expanded latitudinally or longitudinally due to backwater flooding.

While short-term effects of restoration would have potentially moderate to major impacts on vegetation communities in Olema Marsh, over the long-term, this alternative would be expected to have minor to moderate beneficial effects on vegetation resources. While the composition of vegetation communities would perhaps not change dramatically, the sustainability of this system would be far greater than under non-restored conditions. The degree of restoration possible is ultimately constrained by the inability to effectively relink this once tidal marsh with the Giacomini Ranch because of the inordinate amount of fill present in Levee Road and White House Pool County Park, which now separates the marsh from Lagunitas Creek and the Giacomini Ranch. However, relative to current conditions, the trend in riparian habitat die-back would be stopped and even reversed, which would have important implications for wildlife that are discussed further under the Fish and Wildlife Resources section.

Another negligible change in vegetation communities adjacent to Olema Marsh would come from conversion of approximately 2 acres of upland grassland in the Olema Creek watershed to Open Water and Freshwater Marsh through excavation of several small depressional features as mitigation for impacts to California red-legged frog habitat.

Vegetation Communities – Quarry Access Routes: Hauling of excavated sediments to quarries in the Tomales or Pierce Point area would not be expected to have any long-term effect on native vegetation communities. Most of these quarries are serviced directly by roads. One of the quarries would require crossing through a pasture dominated by pastoral herbs and forbs, as well as scattered patches of native grasses, herbs, and shrubs, including some wetland and rare plant areas (see more detailed description below). Construction-related effects would be expected to be negligible adverse, because the Park Service would institute construction mitigation measures to ensure that rare plants and, to the extent possible, wetlands are not impacted.

Vegetation Communities - Project Area Summary: From an overall project perspective, changes under Alternative C would result in a major beneficial effect on native vegetation communities, decreasing the extent of non-native vegetation communities by almost 70- 90 percent relative to the 467 acres that exist under baseline conditions. The major change under Alternative C in terms of the extent of non-natives would come from complete removal of the West Pasture levee and restoration and revegetation efforts in the grasslands in the southern portion of the East Pasture. As discussed under all of the other alternatives, the response would not be as dramatic over the short-term in the Giacomini Ranch in terms of reduction in non-native communities. Non-native opportunistic species characteristic of brackish conditions such as brass buttons, annual beard grass, loosestrife, birdfoot trefoil, and curly dock would move into areas disturbed by levee removal and breaching for some period of time, as the salts in tidal waters slowly killed off the less salt-tolerant pasture grasses and convert grassland into marsh. The rate at which native salt marsh replaces these transitional communities probably depends on a number of factors, including proximity to tidal channels, frequency of tidal inundation, amount of freshwater inundation, climatic cycles such as a series of very wet years, and soil nutrient and salt conditions. This dynamic would minimize the conversion from non-native to native communities over the short-term, leading to only potentially a negligible beneficial effect during this timeframe. In combination with the moderate to major short-term adverse effects expected in Olema Marsh, the overall short-term effects for this alternative would be characterized as minor and adverse.

At higher elevations in the Giacomini Ranch that are less frequently inundated by tides and perhaps more subject to freshwater influence from groundwater or run-off, communities more characteristic of disturbed conditions would be expected to persist for some time, if not indefinitely. These disturbance-adapted communities would be further promoted by the high nutrient concentrations present in the former dairy pastures due to high grazing intensities and practices such as manure spreading. Nutrient concentrations probably are highest in the southern portion of the East Pasture, where elevations are highest, tidal influence would be least, and disturbance from overbank flooding of Lagunitas Creek would be highest. A more complete description of this issue can be found under the No Action Alternative. Under Alternative C, a considerable amount of this nutrient load is removed through scraping of surficial soils in approximately 40 acres, however, nutrient concentrations may be high in some of the lower soil strata, as well. Scraping is intended primarily to remove seeds and a large proportion of the existing non-native species present. As discussed earlier, these soil and flood disturbance factors would lead the large grassland area within the East Pasture to remain dominated by largely non-native species, although restoration efforts, including scraping

and limited revegetation, should increase cover of native species at least moderately relative to what would be expected with no restoration.

Wetland and Riparian Resources: Similar to Alternatives A and B, riparian habitat and, along certain portions of the ranch perimeter, freshwater wetland communities such as Wet Meadow and Freshwater Marsh would be expected to expand slightly in response to removal of grazing and the discontinuation of frequent ditching that was performed to drain pastures for improved grazing. These passive restoration components would combine with the more active restoration components of levee breaching and removal, tidal channel creation, freshwater marsh creation, road removal, excavation of concentrated manure disposal, and removal of spoil piles to have a major beneficial effect on wetlands in the Project Area. Approximately 490 acres of Corps' jurisdictional wetlands and another approximately 47 of jurisdictional waters or unvegetated aquatic areas already exist within the 613-acre Project Area.

Under Alternative C, the eastern perimeter trail would be converted into two spur trails, eliminating the wetland fill and riparian/bluff vegetation removal required to construct either a culverted berm or boardwalk through-trail. Alternative C would still result in approximately 1.74 acres of wetland loss from fill used to create a high tide refugia for special status species in the West Pasture and a low refugia berm adjacent to the created Tomasini Triangle freshwater marsh in the East Pasture. In addition, there could be some minor adverse construction-related effects to 0.06-acre of wetlands through hauling of excavated sediment on the established western approach route to the McClure DG quarry: these impacts would be avoided or minimized through implementation of BMPs discussed in Chapter 2. If this alternative was selected, a Statement of Findings would need to be prepared in accordance with Park Service policy, because more than 0.25 acres of wetlands would be adversely impacted: a Statement of Findings for the preferred alternative can be found in Appendix D. There would also be some potential permanent fill of wetlands and removal of riparian habitat associated with the potential future extension of the southern perimeter trail to Inverness Park through possible widening of the Sir Francis Drake Boulevard road berm. The level of impact with berm widening would vary depending on final design, but impacts would be expected to minor to moderate unless the trail was placed instead on a boardwalk through the West Pasture.

These losses would be offset, however, by creation of approximately 18.8 acres of wetland in the Giacomini Ranch through complete levee removal; restoration of the ranch roads; and excavation of spoil piles, berms, manure disposal areas, and upland areas, resulting in a net gain of 17.0 acres of wetlands. Restoration actions in Olema Marsh would not be expected to decrease the extent of wetlands, but rather to change the type of wetland (e.g., forested versus emergent). It may also temporarily decrease functionality of this wetland, but these effects are addressed under other sections of this chapter, including Soil Resources, Water Resources-Water Quality, and Fish and Wildlife Resources. Overall, then, moderate adverse impacts to wetlands would be expected during construction from temporary stockpiling. However, permanent loss of 1.74 acres of wetland from construction of high-tide refugia would be offset by passive and active restoration, resulting in a net gain of more than 17 acres.

Within the East Pasture and Olema Creek area, there would be some conversion of wetland types such that ditches would be filled to create emergent marsh, but at least 4.9 acres of new tidal channels with a planform or morphology more characteristic of natural marshes would be excavated to increase tidal influence into the interior of the pasture. In addition, construction of mitigation ponds near Olema Creek would potentially convert seasonally flooded, ruderal-dominated floodplains into open water- and freshwater marsh-dominated wetland communities. Moderate adverse effects on wetlands may occur during construction from stockpiling of excavated sediments, use of coffer dams to temporarily dewater construction areas, and excavation of a more defined flow path in Bear Valley Creek, but BMPs would be instituted to minimize construction impacts. Activities within wetlands would require permits from the Corps under Section 404 of the CWA, the CCC under the federal Coastal Act, and the RWQCB under Section 401 of the CWA.

Under Alternative C, there would be no direct adverse impacts to riparian habitat, unless the Levee Road culvert is replaced as part of the adaptive restoration approach for Olema Marsh or the southern perimeter trail is extended to Inverness Park by widening of the Sir Francis Drake Road berm as part of the potential future collaborative project with the County. Widening of the Bear Valley Creek outlet channel to improve hydraulic connectivity could result in loss of less than 0.05 acres of riparian habitat. Over the short-term, some indirect changes may occur in riparian habitats upstream of Bear Valley Road as a result of replacement of culverts that are undersized and cause backwater flooding upstream of the culvert. Improvement in hydrologic connectivity and a decrease in ponding upstream of the culverts would be expected to potentially reduce the width of the wetland and/or riparian habitat corridor for some distance upstream. Based on hydrology and the size of the wetland-riparian corridors in both areas, only a very negligible reduction in the

extent of wetland and riparian habitat would probably occur. Therefore, this alternative would not be expected to violate state and local policies regarding protection of riparian resources.

Similar to Alternative B, a net gain of riparian habitat would occur over the long term from both passive and active restoration efforts, with active restoration efforts resulting in a net increase of approximately 11.6 acres. Similar to Alternative B, active riparian revegetation would be conducted along the entire southern portion of the East Pasture Lagunitas Creek bank and along the upper portions of Fish Hatchery Creek to accelerate reestablishment of riparian vegetation. In addition, under Alternative C, riparian revegetation would occur on the north bank of Tomasini Creek between Mesa Road and the Giacomini Hunt Lodge, which would be the terminus for one of the spur trails proposed. As noted earlier, riparian habitat would also expand naturally in many portions of the Project Area, including the upland perimeters of the East and West Pastures and Olema Marsh, with the degree of expansion in the latter ultimately dependent on which adaptive restoration actions would be taken and the subsequent degree of drawdown in water surface levels.

Long-Term Changes: Over the next 100 years, a net increase in wetlands and a subtle shift in wetland types could occur if sea levels rise as dramatically as has been recently projected. Recently published studies suggest that sea level may be rising as at much higher rates than originally predicted, with water levels potentially rising as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88, converting to intertidal emergent wetlands to subtidal and intertidal unvegetated habitats, and a shift upwards in the extent of areas subject to tidal inundation, thereby increasing wetland habitat and decreasing upland or grassland habitat within the Project Area. Within Olema Marsh, a sea level rise of 3 feet would be expected to increase the extent of tidal influence within the marsh considerably, causing a large-scale conversion to brackish marsh.

Special Status Plant Species: As discussed under the other alternatives, most of the special status species that occur or have to potential to occur in the Project Area are wetland- or riparian-associated species, although there are a few non-wetland species in the vicinity of the quarry access route to the McClure DG quarry. At least five Tidal Salt Marsh or Tidal Brackish Marsh species have been documented either in the Project Area or immediate vicinity, including Point Reyes bird's-beak, Humboldt Bay owl's-clover, salt marsh owl's-clover, Lyngbye's sedge, and Pacific cordgrass. These plants do not occur in the Project Area within diked marsh areas, although Humboldt Bay owl's-clover has established on the tidal marsh fringe or shelf on the outboard of both the West and East Pasture levees. None of these species are listed as endangered, threatened or rare by either the USFWS or CDFG, but they are designated as Species of State Concern by CNPS and/or were formerly designated as Species of Regional Concern by the Sacramento USFWS office.

Because this alternative would be expected to have major beneficial effects on Tidal Salt Marsh and Tidal Brackish Marsh, it would also be expected to have major beneficial effects on the potential for special status plant species to expand in areal extent and numbers. Similar to Alternative B, this alternative would be expected to create more than 350 acres of salt and brackish marsh habitat. It is difficult to predict whether the restored wetland would be colonized by these species, but the proximity to established populations does considerably increases the potential for establishment to occur.

As discussed in detail under Alternative A, there is a potential for negligible to moderate impacts associated with hauling of excavated sediments to the McClure DG quarry. These impacts could be minimized by 1) creating a new approach for the western access route that would avoid the Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road.

Invasive Plants: Under Alternative C, the Seashore would expand invasive plant to remove approximately 10.5 acres of Himalayan blackberry in addition to the cape ivy, pampas grass, and Himalayan blackberry occurrences proposed for eradication under Alternative B. As was discussed under Alternative A, invasive plant species represent a select subset of largely, although not exclusively, non-native species that are believed to represent some of the worst threats to viability and persistence of native vegetation communities and functions played by these communities for wildlife. Under this alternative, Himalayan blackberry would be removed from the entire southern portion of the East Pasture levee or creek bank, as well as from the small hillslope below the dairy facility on the mesa. In addition, under this alternative, blackberry would be removed from the Tomasini Creek riparian zone between Mesa Road and the Giacomini Hunt Lodge. This alternative would completely eradicate cape ivy and pampas grass within the Project Area and would remove

approximately 70 percent of the Himalayan blackberry within the Project Area. Overall, it would have a moderate effect on the total acreage of invasive plant species within the Project Area, reducing it by approximately 35 percent.

Possible Additional Mitigation Measures: Possible additional mitigation measures to reduce short-term impacts to vegetation communities in Olema Marsh could include actions that would result in a more gradual change in water surface levels in Olema Marsh. Through a gradual reduction in water surface levels, changes to soil nutrient -- and potentially soil contaminant -- conditions would occur over a longer time period to ensure that impacts to vegetation and other resources are minimized to the extent possible. Possible mitigation measures include installation of a temporary culvert in the berm or excavation of a small lowered section or breach. With use of a breach measure, the marsh would drain over the summer, and high flows during the winter would blow out the remainder of the berm. Installation of a culvert may require construction of a temporary coffer dam to dewater conditions sufficiently to allow for proper placement.

Effectiveness of Possible Additional Mitigation Measures: By instituting a more gradual reduction in water surface levels, some of the adverse effects associated with pulses in nutrients and acids that would further impact vegetation communities in Olema Marsh might be lessened or tempered to some degree. This could reduce the amount of invasion by non-native species adapted to nutrient-rich conditions. However, ultimately, the degree of die-back would be similar with or without this mitigation measure, and this approach might prolong the length of time it takes the marsh to reach new equilibrium conditions, actually increasing impacts.

Cumulative Impacts: As was discussed in detail under Alternative A, there are a number of projects that would have cumulative beneficial effects should Alternative C be implemented. These include the Bear Valley Creek Watershed and Fishery Enhancement Project; the Chicken Ranch Beach project in Tomales Bay; and a number of wetland and watershed restoration projects along coastal Marin and in San Francisco Bay. Most of these projects would result in a conversion in wetland type rather than an increase in total wetland acreage, and some would increase the extent of estuarine wetlands such as Tidal Salt Marsh that were lost when dams and roads were constructed. These projects would also increase distribution and long-term viability of certain rare species that occur in wetlands along the Marin Coast and in San Francisco Bay such as Pacific cordgrass and Point Reyes bird's-beak. Cumulatively, the proposed project, in combination with these other projects, would be expected to have a major beneficial effect on estuarine and freshwater wetlands and wetland functionality within Tomales Bay and the Point Reyes region and even a negligible to minor beneficial effect on native vegetation communities and rare plant species.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative C on vegetation and wetland resources in the Project Area would be very similar to Alternative B, with the intensity of effects ranging from minor adverse to major beneficial. Under this alternative, the areal extent of salt marsh and other vegetation communities within the Giacomini Ranch would remain almost identical to that of Alternative B, but restoration would improve vegetation conditions in the grassland in the southern portion of the East Pasture by scraping off the surficial soil layer, thereby decreasing cover of non-native species and nutrient concentrations resulting from grazing and manure spreading. Native grasses and forbs would then be planted in an attempt to expand the amount of native vegetation in what would otherwise be largely a non-native dominated-grassland. Adaptive restoration efforts in Olema Marsh would be expected to halt the current downward trend in extent of riparian vegetation by dramatically lowering surface water levels within the impounded marsh. Over the long-term, these restoration efforts, including grassland restoration and revegetation and complete removal of the West Pasture levee, would result in a decrease in vegetation communities completely dominated by non-natives as much as 70-90 percent, with Olema Marsh already dominated by native vegetation communities.

Over the short-term, however, adverse effects on vegetation resources would be expected, because of moderate to major adverse changes in Olema Marsh as the marsh subsides anywhere from 1- to 4-feet initially in response to lowering of water surface levels. These adverse changes include establishment by non-native opportunistic species and a decrease in the extent of Freshwater Marsh relative to baseline conditions because of lowered water surface levels and subsequent encroachment by riparian vegetation. In the Giacomini Ranch, only a negligible beneficial effect on native vegetation communities would potentially occur over the short-term due to rapid establishment of non-native opportunistic, moderately salt-tolerant species

such as brass buttons, annual beard-grass, loosestrife, birdfoot trefoil, and curly dock as pasturelands slowly convert to marsh through exposure to tidal action and increased salts in water and soils. From an overall project perspective, taking into account changes in both the Olema Marsh and the Giacomini Ranch, effects over the short-term would be characterized as adverse and minor in intensity.

As with Alternative B, major beneficial effects on wetland and riparian vegetation communities would occur with discontinuation of agricultural management practices, elimination of grazing, complete removal of all levees, removal of agricultural infrastructure such as tidegates, tidal reconnection and expansion of historic sloughs, and freshwater marsh creation. The extent of wetlands would not be expected to change with implementation of adaptive restoration, although riparian habitat would probably increase. Minor adverse effects on the areal extent of these communities may occur during construction from stockpiling of excavated sediments, but BMPs would be instituted to minimize construction impacts. These are discussed in more detail under Chapter 2. Overall, moderate adverse impacts to wetlands would be expected during construction from temporary stockpiling. However, permanent loss of 1.74 acres of wetland from construction of high-tide refugia would be offset by 18.8 acres of passive and active restoration, resulting in a net gain of more than 17 acres. This would have a major beneficial effect on wetlands. There would be no temporary impacts to riparian habitat, and losses of less than 0.1 acres from public access-related clearing activities would be offset for a net gain of 11.6 acres. Therefore, this alternative would not violate any state or local policies protecting riparian resources.

There would also be major beneficial effects on the salt marsh-associated special status plant species that already occur in the Project Area in close proximity to the restored wetland, although minor adverse effects may occur during construction due to impacts to occurrences adjacent to removed levees. As discussed in detail under Alternative A, there is a potential for negligible to moderate impacts associated with hauling of excavated sediments to the McClure DG quarry. These impacts could be minimized by 1) creating a new approach for the western access route that would avoid the Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road. Moderate beneficial effects would be expected on extent on invasive plant species through expansion of eradication efforts on cape ivy, pampas grass, and Himalayan blackberry.

Alternative D

Analysis: The effects of Alternative D on vegetation and wetland resources in the Project Area would be largely identical to Alternative C, with the intensity of effects ranging from minor adverse to major beneficial (Table 64). As with Alternative C, Alternative D would have major beneficial effects on native vegetation communities, wetlands, riparian habitat, and special status species in the Giacomini Ranch, largely because of the complete removal of both the East Pasture and West Pasture levees in addition to discontinuation of intensive agricultural management practices, elimination of grazing, removal of agricultural infrastructure, and other restoration actions.

Vegetation Communities: The largest single change under Alternative D relative to Alternative C comes from excavation of the southwestern portion of the East Pasture to intertidal or to lower intertidal elevations. Approximately 32.5 acres of grassland and upland ecotone vegetation communities would be excavated and lowered to active floodplain and intertidal marshplain elevations. This restoration action would be expected to have a minor beneficial effect on native vegetation communities relative to Alternative C, although the overall effect would still be major. Another change under Alternative D is the realignment of the entire Tomasini Creek channel in the Project Area into one of its former historic alignments. This alignment would run through the created Tomasini Triangle freshwater marsh, which would be scaled back slightly from 5.4 acres under Alternative C to 5.2 acres. A small berm would be constructed on both sides of the realigned channel to discourage drainage of the marsh into the creek, and it would be actively revegetated with riparian plant species. In addition to the indirect effects on wetlands and riparian habitat upstream of Bear Valley Road, some indirect changes may occur in riparian habitats upstream of Mesa Road as a result of replacement of culverts that are undersized and cause backwater flooding upstream of the culvert. Improvement in hydrologic connectivity and a decrease in ponding upstream of the culverts would be expected to potentially reduce the width of the wetland and/or riparian habitat corridor for some distance upstream and potentially displace some obligate wetland plant species. Based on hydrology and the size of the wetland-riparian corridors in both areas, only a very minor reduction in width would probably occur.
As with Alternative C, changes under Alternative D would result in a major beneficial effect on native vegetation communities, decreasing the extent of non-native vegetation communities by almost 70- 90

percent relative to the 467 acres that exist under baseline conditions. As discussed under all of the other alternatives, the response would not be as dramatic over the short-term in the Giacomini Ranch in terms of reduction in non-native communities. In combination with the moderate to major short-term adverse effects expected in Olema Marsh, the overall short-term effects for this alternative would be characterized as minor and adverse. Under Alternative D, the extent of grassland is reduced from 40 acres to 26 acres through lowering of the southwestern portion of the East Pasture to intertidal elevations. As discussed under other alternatives, high nutrient concentrations and frequent flooding would lead the large grassland area within the East Pasture to remain dominated by largely non-native species, although restoration efforts, including scraping and limited revegetation, should increase cover of native species somewhat relative to what would be expected with no restoration.

Wetland and Riparian Resources: Alternative D would result in approximately 1.82 acres of wetland loss from fill used to create a high tide refugia for special status species in the West Pasture and the berms in the created Tomasini Triangle freshwater marsh in the East Pasture. If this alternative was selected, a Statement of Findings would need to be prepared in accordance with Park Service policy, because more than 0.25 acres of wetlands would be adversely impacted: a preliminary Statement of Findings for this alternative, which is the preferred alternative, can be found in Appendix D.

These losses would be offset, however, by creation of up to approximately 32.2 acres of wetland through excavation to intertidal elevations; complete levee removal; restoration of the ranch roads; excavation of spoil piles, berms, manure disposal areas, and upland areas, resulting in a net gain of up to 30.4 acres of wetlands. Overall, moderate adverse impacts to wetlands would be expected during construction from temporary stockpiling and hauling of excavated sediments to the McClure DG quarry (~0.06-acre of temporary impact). Overall, this alternative would have a major beneficial effect on wetlands.

As with Alternative C, restoration actions in Olema Marsh would not be expected to decrease the extent of wetlands, but rather to change the type of wetland (e.g., forested versus emergent) and temporarily decrease functionality. Approximately up to 2 acres of wetlands would be created within existing seasonally flooded, ruderal-dominated floodplain in the Olema Creek watershed adjacent to Olema Marsh as mitigation for impacts to California red-legged frog breeding habitat, resulting in conversion to open water and freshwater marsh-dominated wetland communities. Within the East Pasture, wetland conversion would also occur with ditches being filled to create emergent marsh, but at least 5.7 acres of new tidal channels would be excavated to increase tidal influence into the interior of the pasture.

Under Alternative D, there would be no adverse impacts to riparian habitat and no potential violation of state and local policies on protection of riparian habitat. Similar to Alternative C, a net gain of riparian habitat would occur from both passive and active restoration efforts, with active restoration efforts resulting in a net increase of approximately 11.8 acres relative to 11.6 acres under Alternative C. Under Alternative D, new riparian revegetation efforts would be limited to planting of the berm created in the Tomasini Triangle freshwater marsh.

Special Status Plant Species: As discussed under the other alternatives, at least five wetland species have been documented either in the Project Area or immediate vicinity, and all of these are Tidal Salt Marsh or Tidal Brackish Marsh associates, although there are a few non-wetland species in the vicinity of the quarry access route to the McClure DG quarry. Because this alternative would be expected to have major beneficial effects on Tidal Salt Marsh and Tidal Brackish Marsh, it would also be expected to have major beneficial effects on the potential for special status plant species to expand in areal extent and numbers. Similar to Alternative C, this alternative would be expected to create more than 350 acres of salt and brackish marsh habitat. As with the other alternatives, complete removal of the East and West Pasture levees would have the potential to have a minor adverse effect on existing species status plant species occurrences. Also, there is a potential for negligible to moderate impacts associated with hauling of excavated sediments to the McClure DG quarry. These impacts could be minimized by 1) creating a new approach for the western access route that would avoid the Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road.

Invasive Plants: Under Alternative D, the Seashore would expand invasive plant species removal efforts by increasing the amount of Himalayan blackberry removal up to approximately 11.4 acres and also by removing 0.34 acres of eucalyptus (*Eucalyptus globulus*) that is growing on the Tomasini Creek banks. This alternative would remove blackberry from the Tomasini Creek riparian zone between Mesa Road and the Giacomini Hunt Lodge, as well as the entire southern portion of the East Pasture levee or creek bank and the small hillslope

below the dairy facility on the mesa. This alternative would completely eradicate cape ivy and pampas grass within the Project Area and would remove approximately 75 percent of the Himalayan blackberry within the Project Area. Overall, it would have a moderate effect on the total acreage of invasive plant species within the Project Area, reducing it by approximately 39 percent.

Possible Additional Mitigation Measures: Possible additional mitigation measures would be the same as proposed under Alternative C.

Effectiveness of Possible Additional Mitigation Measures: The effectiveness of the possible additional mitigation measures would be the same as discussed under Alternative C.

Cumulative Impacts: Cumulative impacts would be the same as described as under Alternative C.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative D on vegetation and wetland resources in the Project Area would be largely identical to Alternative C, with the intensity of effects ranging from minor adverse to major beneficial (Table 64). As with Alternative C, Alternative D would have major beneficial effects on native vegetation communities, wetlands, riparian habitat, and special status species in the Giacomini Ranch, largely because of the complete removal of both the East Pasture and West Pasture levees in addition to discontinuation of intensive agricultural management practices, elimination of grazing, removal of agricultural infrastructure, and other restoration actions.

Under this alternative, the areal extent of salt marsh and other vegetation communities within the Giacomini Ranch would remain very similar to that of Alternative C, with the exception that up to 32.5 acres would be excavated and lowered to increase active floodplain and intertidal marshplain areas. The extent of grasslands would be reduced from 40 acres under Alternative C to 26 acres under Alternative D through expansion of intertidal habitat. In addition, the size of the Tomasini Triangle freshwater marsh would be scaled back slightly from 5.4 under Alternative C to 5.2 acres, and a berm would be constructed along the channel to prevent drainage of waters within the marsh into the creek. Adaptive restoration efforts in Olema Marsh would be expected to reverse the downward trend in extent of riparian habitat by dramatically lowering surface water levels within the impounded marsh. Over the long-term, these restoration efforts would result in a decrease in vegetation communities completely dominated by non-natives as much as 70-90 percent, with Olema Marsh already dominated by native vegetation communities. Over the short-term, moderate to major adverse changes in vegetation and wetland communities would probably occur in Olema Marsh as it adjusts to almost 1- to 4 feet or more of lowering in water surface levels. From an overall project perspective, short-term effects would then be characterized as minor adverse.

Ultimately, major beneficial effects on wetland and riparian vegetation communities would occur, because of discontinuation of agricultural management practices, elimination of grazing, complete removal of all levees, removal of agricultural infrastructure such as tidegates, tidal reconnection and expansion of historic sloughs, and freshwater marsh creation. Overall, moderate adverse impacts to wetlands would be expected during construction from temporary stockpiling. However, permanent loss of 1.82 acres of wetland from construction of high-tide refugias would be offset by passive and active restoration, resulting in a net gain of more than 30 acres. This would have a major beneficial effect on wetlands. Under Alternative D, there would be no temporary impacts or permanent losses to riparian habitat, and, overall, there would be a gain of 11.8 acres. There would also be major beneficial effects on the salt marsh-associated special status plant species that already occur in the Project Area in close proximity to the restored wetland, although minor adverse effects may occur during construction due to impacts to occurrences adjacent to removed levees. As discussed in detail under Alternative A, there is a potential for negligible to moderate impacts associated with hauling of excavated sediments to the McClure DG quarry. These impacts could be minimized by 1) creating a new approach for the western access route that would avoid the Blasdale's bent grass; 2) collecting seed from spineflower plants in the access route before hauling begins and storing seed for dispersal once construction activities have been completed; and 3) clearly flagging the access route so that trucks do not wander off the established access road. Moderate beneficial effects would be expected on extent on invasive plant species through expansion of eradication efforts on cape ivy, pampas grass, and Himalayan blackberry.

Fish and Wildlife Resources

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Many wildlife species within the United States have been adversely impacted by increasing urbanization, resource extraction, contamination from pesticides, metals, and other pollutants, and introduction of non-native wildlife species. A number of regulations and policies have attempted to protect wildlife from these negative impacts, with most of these focused either on preservation of key or critical habitat or protection and recovery of the species itself.

Some of the habitat protection is accomplished directly through establishment of Critical Habitat and Essential Fish Habitat or California's Lake and Streambed Alteration Agreement (Section 1600) and LCP Zone II's policies on Environmentally Sensitive Habitats. Marin's draft CWP (2005) proposes to establish policies for protection of essential habitat for special status species, wildlife nursery areas, movement corridors, and ecotones, because of their importance to wildlife. Policies in the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) specifically identify "protection of Lagunitas Creek, specifically its water quality, coho salmon and steelhead populations, and other aquatic life." In addition to direct habitat conservation through these laws and policies, habitat protection comes indirectly from other legislation aimed at improving water quality through protection of wetlands and riparian habitat under Section 404 of the Clean Water Act, and LCP Zone II's policies regarding Streamside Conservation Areas and upland buffer areas around wetlands.

Federal and state agencies have moved to protect individual species under federal and state Endangered Species Acts (ESA). The federal ESA protects threatened and endangered species from unauthorized "take", and directs federal agencies to ensure that their actions do not jeopardize the continued existence of listed species. Even bird species that are not necessarily protected under federal or state ESA receive some protection under the Migratory Bird Treaty Act of 1918 (16 U.S.C. §703-712), which protects almost all migratory wild birds from "taking," which is defined as disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young). Park Service Management Policies (2006) require parks to preserve and restore the natural abundances, diversities, dynamics, and habitats of native animal populations and the communities and ecosystems in which they occur (NPS 2006; Section 4.4.1). The Park Service is also specifically urged to not only avoid impacts to threatened or endangered species, but to look for opportunities to restore and to strive to recover these species (NPS 2006; Section 4.4 and 4.4.2.3). A more detailed description of laws, regulations, and policies related to protection of species and wildlife habitats can be found under Fish and Wildlife Resources in Chapter 3.

Under DOI's NEPA significance criteria, actions that would considered significant and require preparation of an EIS include potentially significant impacts on species listed or proposed for listing as threatened or endangered; Critical Habitat; or migratory birds; or actions that would contribute to the introduction, continued existence, spread, or range expansion of non-native species known to occur in the area. The County's CEQA significance criteria focus on the potential for reduction in the number or a substantial alteration of habitats of endangered and threatened fish, insect, and animal species and birds listed as special status by federal and state agencies. Specifically, under CEQA, mandatory findings of significance are required for actions that would cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate an animal community, or reduce the number or range of an endangered animal. Also, these criteria identify substantial changes in the diversity, number, or habitat of any species of animals currently present or likely to occur at any time throughout the year, as well as introduction of new animals into an area or alterations that would result in a barrier to migration, dispersal, or movement of animals.

General Assumptions and Methodologies:

- The purpose of the proposed project is to restore natural hydrologic and ecological processes and functions and processes, which includes habitat for and support of wildlife species within the Project Area and the larger watershed.
- Changes in wildlife habitat are evaluated using maps prepared that predict long-term vegetation community establishment based on changes in tidal hydrologic processes and the extent of tidal influence, as well as qualitative interpretation of the extent and strength of freshwater influences such as overbank flooding from creeks and surface flow from groundwater sources along the perimeter of the Project Area.

- For most of this document, the duration category, "Short-Term," refers to a short period post-project of two to three years that was created to represent dynamic, highly variable conditions expected to occur for a short period after construction that would not be representative of long-term conditions. However, for vegetation and wildlife habitat, which evolve over a longer time period, it is appropriate to lengthen this short-term post-project period to 10 years to reflect the longer timeframe over which vegetation changes would occur, particularly as most of the Project Area would not be bareground, but vegetated, and thereby require a longer transition period.

Described below are methodologies for impact indicators related to fish and wildlife resources, including specific assumptions or details on methodologies.

Changes in High Value Wildlife Habitat: Impact thresholds focus on change in high value wildlife habitat, specifically areal extent of habitats characterized as being of high value to wildlife species currently using the Project Area, as well as those expected to use the Project Area should the proposed project be implemented (Table 65). High value wildlife habitats are defined as those wetland and non-wetland habitats utilized by a high diversity and/or high number of wildlife species, including aquatic organisms such as benthic, planktonic, and macro-invertebrates and fish; amphibians; reptiles; mammals; and bird groups or guilds such as waterfowl, waterbirds, shorebirds, passerines, and raptors. High Value wildlife habitats include 1) Tidal Waters – Subtidal/Intertidal, 2) Non-Tidal Waters-Ponds; 3) Freshwater Marsh; 4) Tidal Salt Marsh (including High/Upland Ecotone), 5) Tidal Brackish Marsh; 6) Mesic Coastal Scrub; 7) Forested and Scrub Shrub Riparian; and 8) Seasonally Flooded-Ponded Pastures/Grasslands and Meadows. A list of high value habitats and some of the associated wildlife species can be found in Table 17 in Chapter 3. Evaluation of changes in cover or areal extent of wildlife habitat is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium or dynamic equilibrium conditions have been reached. For certain alternatives, a relatively short-term (≤10 years) post-construction period would be expected during which wildlife habitats would be in a transitional state prior to reaching to equilibrium conditions. Other types of high value wildlife habitat that have received regulatory designation such as Critical Habitat for steelhead and Essential Fish Habitat for coho salmon are discussed under the Changes in Special Status Wildlife Species section. Changes in overall extent of wetland and riparian habitats, which are very important for wildlife species, are addressed under Vegetation Resources.

TABLE 65. HIGH VALUE WILDLIFE HABITATS IN THE PROJECT AREA

Source: Endangered Species Act (federal, California), Migratory Bird Treaty Act, CDFG Lake and Streambed Alteration Agreement, Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no potential for impact to wildlife habitats in the Project Area associated with the proposed project.
Negligible	There would be a negligible change (≤ 5 percent) in the areal extent of high value wildlife habitats in the Project Area.
Minor	There would be a minor change (> 5 – ≤10 percent) in the areal extent of high value wildlife habitats in the Project Area.
Moderate	There would be a moderate change (> 10 – ≤25 percent) in the areal extent of high value wildlife habitats in the Project Area.
Major or Substantial	There would be a substantial or major change (> 25 percent) in the areal extent of high value wildlife habitats in the Project Area.

Changes in Wildlife Use: Impact thresholds focus on potential changes in use of the Project Area by wildlife with implementation of the proposed project. Changes are analyzed by evaluating whether use by specific orders, guilds, or individual species or taxa would increase, decrease, or remain equivalent to use under existing or baseline conditions. The analysis targets not only species that currently use the Project Area, but those that occur in adjacent areas and might use the Project Area if the proposed project is implemented. Wildlife includes common, as well as special status species that are or are not already addressed by individual criteria. A list of orders, guilds, and individual species or taxa to be evaluated can be found in Table 18 in Chapter 3.

For each of the alternatives, the relative change in abundance of each order, guild, species, or taxa in Table

18 is evaluated relative to baseline conditions. Some weighting was incorporated such that entire guilds and orders or special status species received a higher score than common wildlife species. To some extent, this analysis also evaluated the relative ecological integrity of the wildlife community by giving non-native -- and particularly non-native, highly invasive species – negative scores: highly invasive non-native species were scored lower or more negatively than those not considered to be highly invasive. This analysis also took into account whether the change would represent a new occurrence or simply an increase or decrease of an order, guild, species, or taxa that is already present under baseline conditions. For analysis purposes, the Project Area was split into Giacomini Ranch-East Pasture, Giacomini Ranch-West Pasture, Tomasini Creek, Lagunitas Creek, and Olema Marsh and then summed for each alternative. In general, this impact indicator focuses on the intensity of change without characterizing losses or gains of particular native orders, guilds, and taxa as beneficial or adverse. However, this indicator does assume the following: (1) the Project Area does not support the number of native wildlife species that it could under unmanaged conditions; (2) increases in the number or abundance of native wildlife species would be beneficial and enhance species diversity or richness; and (3) increases in the number of non-native species would not be beneficial, even if species diversity or richness was increased.

TABLE 66. GENERAL WILDLIFE USE OF THE PROJECT AREA

Source: Endangered Species Act (federal and California), Migratory Bird Treaty Act, Marine Mammal Protection Act, CDFG Lake and Streambed Alteration Agreement (1600), Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no potential for impact to wildlife use of the Project Area associated with the proposed project.
Negligible	There would be a negligible change (≤ 5 percent) in wildlife use of the Project Area.
Minor	There would be a minor change (> 5 – ≤10 percent) in wildlife use of the Project Area.
Moderate	There would be a moderate change (>10 – ≤25 percent) in wildlife use of the Project Area.
Major or Substantial	There would be a substantial or major change (>25 percent) in wildlife use of the Project Area.

Invasive Wildlife Species: Impact thresholds focus on change in non-native invasive wildlife species, specifically potential changes in the extent of area occupied or the number of occurrences. For purposes of this analysis, evaluation focuses on non-native invasive wildlife species identified by the Seashore, project planning team, or watershed groups as high priority species for management or eradication. The species of highest concern for the Project Area, watershed, or park are the green crab (*Carcinus maenas*; undiked marsh north of Giacomini Ranch), bullfrog (East Pasture, Tomasini Creek, Olema Marsh), and the red fox (*Vulpes vulpes*; Giacomini Ranch-East Pasture and dairy facility). Other non-native species of concern include the yellowfin goby (*Acanthogobius flavimanus*; in Lagunitas Creek), turkeys (*Meleagris gallopavo*; in the West Pasture), brackish water or Korean shrimp (*Palaemon macrodactylus*; in Lagunitas and Tomasini Creeks), mosquitofish (*Gambusia affinis*; in Giacomini Ranch East and West Pastures), and crayfish (Giacomini Ranch East and West Pastures).

Projects have the potential for affecting the extent of invasive wildlife species through 1) changes in habitat; 2) increasing disturbance, which can encourage expansion of species adapted to disturbance; 3) increasing hydraulic connectivity; and 4) changing physical conditions such that viability of existing occurrences and potential for establishment or expansion is affected, either positively or negatively. The analysis of the potential for an increase or decrease in invasive species takes into account, then, information on predicted changes in physical conditions and habitats obtained from hydraulic and hydrodynamic modeling (KHE 2006a) and future vegetation communities maps. Because the Project Area is already moderately to highly invaded, and because it is difficult even with the most well-designed wetland restoration project to avoid invasions by non-native aquatic species in the extremely highly invaded San Francisco Bay region, the impact thresholds for this threshold have been broadened to allow for the eventuality that restoration may not be able to be accomplished without invasion by at least some non-native aquatic organisms (Table 67).

TABLE 67. INVASIVE WILDLIFE SPECIES

Source: Park Service Management Policies, DOI **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed, Regional (San Francisco Bay area) **Duration**: *Short-Term, Long-Term*	
No Impact	There would be no potential for change in the area occupied or the abundance of non-native invasive wildlife species associated with the proposed project.
Negligible	There would be a negligible change (≤10 percent) in the area occupied or abundance of non-native invasive species in the Watershed.
Minor	There would be a minor change (>10 percent and ≤ 25 percent) in the area occupied or abundance of non-native invasive species in the Watershed.
Moderate	There would be a moderate change (>25 percent and ≤ 50 percent) in the area occupied or abundance of non-native invasive species in the Watershed.
Major or Substantial	There would be a major and substantial change (> 50 percent) in the area occupied or abundance of non-native invasive species in the Watershed.

Potential for Wildlife in Watershed to be Affected by Proposed Project: While the proposed project has the potential to affect wildlife habitat and use within the Project Area, one of the most important functions of wetlands is the ability to support the larger wildlife community within a watershed or region. Wetlands provide a source of food through export of dissolved or particulate organic carbon, detritus, seeds, invertebrates, fish, and higher order animals that can to downstream water bodies for consumption by marine and estuarine wildlife species. In addition, wetlands provide alternate foraging and refugia habitat for marine and estuarine organisms that normally spend most of their time in the open waters of Tomales Bay or the Pacific Ocean. Many of these species represent occasional, incidental, or vagrant visitors to southern Tomales Bay that move higher into the estuary in search of food. Should contributions to the larger wildlife community be high enough, wetlands can actually influence the types or assemblages of species that frequent downstream habitats. The proposed project has the potential to affect both the opportunity and capacity of the Project Area to support the larger wildlife community within the watershed. Because of the difficulty in quantifying changes in wildlife conditions within the watershed from the proposed project, *impact thresholds qualitatively assess the potential for change under the various alternatives* (Table 68). Certain components related to opportunity (e.g., need for hydrologic connectivity to move food resources out and allow marine and estuarine organisms into wetlands) or capacity (e.g., potential for increase in prey items such as fish within wetlands) have already been addressed to some degree under Water Resources and Wildlife Resources – High Value Wildlife Habitats, respectively.

TABLE 68. POTENTIAL FOR WILDLIFE CONDITIONS IN WATERSHED TO BE AFFECTED BY PROPOSED PROJECT

Source: Park Service Management Policies, CCC/LCP Zone II, Marin CWP, Community Plan **Nature**: Beneficial, Adverse **Context**: Project Area **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no potential for impact to wildlife and aquatic organisms in the Tomales Bay watershed associated with the proposed project.
Negligible	A barely detectable change in conditions for wildlife would be expected downstream of the Project Area based on changes in conditions in the Project Area, including changes in the rates of production and transport of food (i.e., carbon, prey items, etc) and availability of alternate foraging and refugia habitat for marine and estuarine organisms. Changes would be in the range of natural variability for conditions in natural wetlands in Tomales Bay and surrounding watersheds and would not result in any detectable effect on food resource conditions or species assemblages in southern Tomales Bay.
Minor	A measurable change in conditions for wildlife would be expected downstream of the Project Area based on changes in conditions in the Project Area, including changes in the rates of production and transport of food (i.e., carbon, prey items, etc) and availability of alternate foraging and refugia habitat for marine and estuarine organisms. Change might be expected to result in a barely detectable effect on food resource conditions in southern Tomales Bay, but no effect on species assemblages.
Moderate	An apparent and measurable change in conditions for aquatic organisms and wildlife would be expected downstream of the Project Area based on changes in conditions in the Project Area, including changes in the rates of production and transport of food (i.e., carbon, prey items, etc) and availability of alternate foraging and refugia habitat for marine and estuarine organisms. Change might be expected to result in a measurable effect

TABLE 68. POTENTIAL FOR WILDLIFE CONDITIONS IN WATERSHED TO BE AFFECTED BY PROPOSED PROJECT

	on food resources conditions in southern Tomales Bay and a barely detectable effect on species assemblages.
Major or Substantial	A substantial and major change in conditions for aquatic organisms and wildlife would be expected downstream of the Project Area based on changes in conditions in the Project Area, including changes in the rates of production and transport of food (i.e., carbon, prey items, etc) and availability of alternate foraging and refugia habitat for marine and estuarine organisms. Change might be expected to result in an appreciable effect on food resources conditions in southern Tomales Bay and a measurable effect on species assemblages.

Effect on Special Status Wildlife Species: Impact thresholds focus on effects of the proposed project on key special status wildlife species, specifically potential changes in areal extent of habitat relative to existing conditions. The proposed project could affect these species through both construction- and project-related actions. For purposes of this analysis, separate quantitative impact indicators were developed for each key special status species, but construction-related effects are evaluated for each species using the a single set of impact thresholds shown in Table 69. Construction-related effects take into account the extent to which standard Best Management Practices (BMPs) have been incorporated into the proposed project to minimize impacts of construction on wildlife. Most of these standard BMPs are discussed in Chapter 2; any other measures proposed to mitigate construction impacts are discussed in this section.

For project-related effects, the potential effect of the project on the extent and quality of habitat is considered. The analysis takes into account both impacts to existing habitat, as well as the potential for creation of new habitat. However, it errs on the conservative or cautious side by placing a higher value on maintenance of existing habitat than on creation of new habitat, which inherently poses more risk to viability of special status species population. Impact indicators deemphasize interpretation of impacts from changes in population size or number of individuals, because many species show wide interannual variability in numbers, use the Project Area for only a limited portion of their lifecycle, or are only sporadically present within the Project Area and vicinity (e.g., California clapper rail). Most of these impact indicators use another, broader context in addition to the Project Area one to help evaluate the intensity of impacts. This is because the proposed project's effect on distribution of regional subpopulations, extent of the species' range, or distribution or viability of the species as a whole may need to be considered to accurately assess its impact on a listed species. Analysis of changes in cover or areal extent of habitat for special status wildlife species is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium or dynamic equilibrium conditions have been reached. Assumptions used in evaluating the effects of the proposed project for key special status wildlife species are outlined below:

TABLE 69. SPECIAL STATUS WILDLIFE SPECIES – CONSTRUCTION-RELATED EFFECTS

Source: Endangered Species Act (federal and California), Migratory Bird Treaty Act, CDFG Policy, Park Service Management Policies, CCC/LCP, Marin CWP **Nature**: Adverse **Context**: Project Area, Watershed (southern portion of Tomales Bay) **Duration**: Construction	
No Impact	There would be no potential for impact to special status species associated with construction of the proposed project.
Negligible	Construction would have barely detectable effects on special status species. Construction would not impact breeding or non-breeding individuals or young. Construction activities would not directly impact habitats for the species. Indirect effects would be barely detectable.
Minor	Construction would have measurable effects on special status species. Construction would have no more than measurable effects on non-breeding individuals and no effects on breeding individuals or young. Construction activities would have a barely detectable direct effect on breeding habitats, although they might have a measurable effect on non-breeding habitats. Indirect effects may be measurable.
Moderate	Construction would have appreciable effects on special status species. Construction would have appreciable effects on non-breeding individuals and barely detectable effects on breeding individuals or young. Construction activities would have a measurable direct effect on breeding habitats and/or an appreciable effect on non-breeding habitats. Indirect effects may be appreciable.
Major or Substantial	Construction would have major or substantial effects on special status species. Construction would have major or substantial effects on non-breeding individuals and measurable to major or substantial effects on breeding individuals or young. Construction activities would have at least an appreciable direct effect on breeding habitats and/or a major or substantial effect on non-breeding habitats. Indirect effects may be major or substantial.

California red-legged frog (federally threatened)

- California red-legged frog (*Rana aurora draytonii*) is identified as a Critical Resource objective for the proposed project, although objectives emphasize preserving the total extent or amount of habitat rather than focusing on maintaining the existing habitat *in situ* or in place.
- The Project Area does not fall within Critical Habitat areas identified by the USFWS, however, the Seashore and adjoining West Marin lands are designated as the Point Reyes Peninsula Core Area. Core Areas represent areas where USFWS will concentrate their recovery actions, because the amount of protected area will allow for long-term viability of existing populations.
- Evaluation of potential impacts to California red-legged frog under the various alternatives focuses on two elements (Table 70). One of these elements assesses change in appropriate breeding habitat units in the Seashore-owned and managed portions of the Point Reyes Peninsula Core Area, with "appropriate" breeding habitat defined as meeting the following structural and non-structural criteria based on constituent elements identified as important in the USFWS Critical Habitat designation and information from Dr. Gary Fellers, Research Biologist, USGS:
  - *Breeding Habitat*: Seasonally flooded areas that are inundated through at July or August of most years, except during extreme drought, with a minimum deep water depth of 20 inches and within 660 to 3,300 feet of a permanent non-breeding water source (G. Fellers, USGS, *pers. comm*.); OR
  - Riparian and/or upland habitat surrounding or bordering seasonally flooded areas up to 300 feet from the water's edge (USFWS);
  - *Water Salinity*: Breeding habitat should have waters with maximum salinities less than 4.5 ppt
  - *Predators*: While bullfrogs are predators of red-legged frog and are considered to be a deterrent to stable red-legged frog populations, the presence of bullfrog is not necessarily an indication that red-legged frog populations are in jeopardy (G. Fellers, USGS, *pers. comm*.). Seasonally flooded areas that draw down completely in the fall do tend to preclude bullfrogs, because bullfrog tadpoles require year-round inundation (S. Granholm, wildlife biologist, LSA Associates, *pers. comm*.).
  - *Documented Habitat in Recovery Unit*: Based on surveys conducted by the USGS, there are approximately 76 documented breeding habitat units in the Pastoral Zone of the Seashore (NPS 2004). The Pastoral Zone represents approximately one-third of the Seashore land area. A unit is defined as a discrete pond or other type of wetland or water feature in which frogs are known to breed or have been consistently observed and are believed to breed.
- The second element used for evaluation of changes to California red-legged frog under the various alternatives involves expected changes in distribution of the species within the Project Area and/or in the Seashore-owned or managed portions of the Point Reyes Peninsula Core Area.
- Under some alternatives, there is a potential for short-term impacts relating to the length of time that would be required for vegetation communities to undergo the transition from pasturelands to more unmanaged habitats, including establishment and development of any new freshwater marsh areas.

TABLE 70. SPECIAL STATUS WILDLIFE SPECIES - CALIFORNIA RED-LEGGED FROG

Source: Endangered Species Act (federal and California), Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Regional (Point Reyes Recovery Unit), Supra-Regional (Species Range) **Duration**: Short-Term(Temporary), Long-Term (Permanent)	
No Impact	There would be no potential for impact to California red-legged frog associated with implementation of the proposed project.
Negligible	There would be a barely detectable effect (≤ 1 percent) expected on appropriate breeding habitat units in the Point Reyes Peninsula Core Area. Would be expected to have a barely detectable effect on Project Area distribution of species and no effect on distribution in the Point Reyes Peninsula Core Area.
Minor	There would be a measurable effect (> 1 percent and ≤ 2 percent) expected on appropriate breeding habitat units in the Point Reyes Peninsula Core Area. Would be expected to have a measurable effect on Project Area distribution of species, but no effect to a barely detectable effect on distribution in the Point Reyes Peninsula Core Area.
Moderate	There would be an appreciable effect (> 2 percent and ≤ 5 percent) expected on appropriate breeding habitat units in the Point Reyes Peninsula Core Area. Would be expected to have an appreciable effect on Project Area distribution of species and either a barely detectable or measurable effect on distribution in the Point Reyes Peninsula Core Area.
Major or Substantial	Would have a major or substantial effect on breeding habitat (> 5 percent) expected on appropriate breeding habitat units in the Point Reyes Peninsula Core Area. Would be expected to have a striking effect on Project Area distribution of species and a measurable or appreciable effect on distribution in the Point Reyes Peninsula Core Area.

Tidewater goby (federally endangered)

- Tidewater goby (*Eucylogobius newberryi)* is identified as a Critical Resource objective for the proposed project, although objectives emphasize preserving the total extent or amount of habitat rather than focusing on maintaining the existing habitat *in situ* or in place.
- The proposed project has the potential to affect tidewater goby through restoration of tidal and freshwater hydrologic processes.
- Restoration of freshwater hydrologic processes would also have the potential to affect gobies should actions increase flood scour or sedimentation that eliminates the preferred sandy substrates or eliminate sheltered, backwater habitat areas.
- The population in the Project Area represents a genetically distinct unit from the other nearest populations at Salmon Creek Marsh and Rodeo Lagoon, which are located outside the Tomales Bay watershed. Therefore, impacts to the Project Area population would have impacts on regional distribution.
- Analysis of potential impacts to tidewater goby habitat under the various alternatives focuses on changes in acreage of habitat, with "appropriate" habitat defined as meeting the following criteria based on information published in the Recovery Plan and discussed in other documents (Swift 2003):
    - Critical habitat is being proposed to be expanded to include northern California, as well as southern California, and would include portions of the Project Area, specifically Tomasini Creek, the West Pasture, and the undiked portions of Lagunitas Creek and the marshlands north of the Giacomini Ranch.
    - Brackish water portions of creeks or open water impoundments (e.g., lagoons) that maintain salinities in or below the 20 ppt range during the summer and fall;
    - Reduced flood scour OR backwater or sheltered areas along creeks subject to high flood scour that offer refugia during flood events;
    - Maintenance of some areas with permanent subtidal conditions in creeks or open water impoundments;
    - Presence of sandy substrate in some portion of creek or open water impoundment for burrows.
    - *Presence of predators*: Some of the documented freshwater and brackish water predators on goby include largemouth bass, green sunfish (*Lepomis cyanellus*), striped bass (*Morone saxatilis*), yellowfin goby, and shimofuri goby (*Tridentiger bifasciatus*; Swift 2003). Crayfish may disrupt nesting sites while digging for the eggs in the sand (Swift 2003). The native rainbow trout or steelhead, starry flounder, Pacific staghorn sculpin, and prickly sculpin have also been documented to feed on tidewater gobies in the lower Santa Ynez River and elsewhere (Swift 2003).
- Under some alternatives, there is a potential for short-term impacts relating to the length of time that would be required for the appropriate habitat to develop, including establishment and development of any new brackish water channels.

TABLE 71. SPECIAL STATUS WILDLIFE SPECIES – TIDEWATER GOBY

Source: Endangered Species Act (federal and California), Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Supra-Regional (central/northern California portion of population range) **Duration**: Short-Term(Temporary), Long-Term (Permanent)	
No Impact	There would be no potential for impact to tidewater goby associated with implementation of the proposed project.
Negligible	There would be a barely detectable effect (≤ 1 percent) on the areal extent of appropriate habitat relative to the extent of areas currently supporting this species. Would have no detectable effect on Project Area distribution of species.
Minor	There would be a measurable effect (> 1 percent and ≤ 10 percent) on the areal extent of appropriate habitat relative to the extent of areas currently supporting this species. Would have a barely detectable effect on Project Area distribution of species.
Moderate	There would be an appreciable effect (> 10 percent and ≤ 25 percent) on the areal extent of appropriate habitat relative to the extent of areas currently supporting this species. Would have a measurable effect on Project Area distribution of species.
Major or Substantial	There would be a major or substantial effect (> 25 percent) on the areal extent of appropriate habitat relative to the extent of areas currently supporting this species. Would have an appreciable effect on Project Area distribution of species.

Central California coast steelhead Designated Population Segment (DPS), (federally threatened), coastal California Evolutionarily Significant Unit (ESU) Chinook salmon (federally threatened), and central California coast coho ESU salmon (State/federally endangered)

- Three federally protected salmonids occur within the Lagunitas Creek watershed: coast steelhead (*Oncorhynchus mykiss*), Chinook salmon (*O. tshawytscha*), and coho salmon (*O. kisutch*). Salmonids are identified as a Critical Resource objective for the proposed project
- The Lagunitas Creek watershed, including Olema Creek, has been documented to support 10 percent of the CCCESU coho population (Brown et al. 1994). It represents one of the southernmost, stable populations of coho salmon within the CCCESU.
- The Project Area does not represent a potential breeding or spawning area for steelhead, coho or Chinook salmon. These types of salmonids typically breed in the upper portions of the watershed in medium- to high-gradient tributaries.
- The proposed Project Area represents important feeding habitat for salmonids as they migrate to the ocean. Smolts may spend days to weeks in estuarine habitat feeding in nutrient-rich areas and growing prior to heading to the open ocean. While this is a relatively short period of time, this transitional life stage may have direct implications on the ocean survival of smolts, as there is direct correlation between increased smolt weight lead to higher adult survivorship (Naiman et al. 2002), but improved water quality and stream access should improve spawning success.
- The proposed project has the potential to affect salmonids through restoration of tidal and freshwater hydrologic processes.
    - Migration of salmonids is inhibited by hydrologic infrastructure such as barriers (e.g., dams or tidegates); culvert installations that are poorly designed or in poor condition; creeks with poor hydraulic connectivity due to backwater effects; and lack of instream refugia (e.g., pools, large woody debris, overhanging or instream vegetation, etc.).
    - Rearing of salmonids in estuaries -- where that occurs -- can be limited by levees that eliminate tidal marshes and creeks where rearing can occur or eliminate access to marshes, as well as a lack of appropriate foraging and refugia habitat, a lack of appropriate prey such as mysid shrimp, and lack of access to marshplains at high tides. In addition, temperatures can be a prohibitive factor, although less so in the case of fish that move quickly through estuarine reaches.
- Because of the lack of information on salmonid use of estuarine areas in Tomales Bay, analysis of impacts to salmonid passage and estuarine rearing habitat under the various alternatives focuses on changes in opportunity -- specifically the amount of impediments or obstacles to passage and the amount of potential "appropriate" rearing habitat -- and capacity or quality of the available habitat. The analysis uses the following methodologies and assumptions (Table 72):
    - *Salmonid Passage/Refugia Opportunity and Capacity – Project-Related Effects*: The analysis of effects on salmonid passage and rearing potential uses a "checklist" approach, with hypothesized or known barriers to salmonid migration and/or rearing within the Project Area totaled for each subwatershed.
    - *Salmonid Rearing and Refugia Habitat Capacity– Project-Related Effects*: Analysis of salmonid rearing and foraging/refugia capacity is based on the total aquatic edge or linear perimeter of tidally connected creek available during daily high tides, which is an indicator or metric for salmonids used in functional assessment methodologies for wetlands (Simenstad et al. 2000). Total aquatic edge measures the outer perimeter of all tidal creeks influenced by daily high tides, with the assumption that juvenile salmonids spend much of their time adjacent to tidal creeks banks because of the refugia and foraging opportunities available in these edge habitats.
- While these impact indicators do not specifically address capacity issues such as water temperature and actual refugia habitat available from overhanging banks and vegetation and large woody debris, they do provide a semi-quantitative tool for assessing potential effects of the proposed project. Based on continuous water quality monitoring, water temperature does not appear to be an issue for salmonids in Lagunitas Creek during the typical outmigration period for salmonid smolts.
- Under some alternatives, there is a potential for short-term impacts relating to either development of new tidal creeks or disturbance conditions following creation of new tidal channels.

TABLE 72. SPECIAL STATUS WILDLIFE SPECIES - SALMONIDS

Criteria: Effects on Opportunity for Salmonid Passage and Rearing
Source: Endangered Species Act (federal and California), Magnuson-Stevens Fishery Conservation and Management Act, Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed **Duration**: Long-Term

TABLE 72. SPECIAL STATUS WILDLIFE SPECIES - SALMONIDS

No Impact	There would be no potential for impact to salmonid passage and rearing opportunity associated with implementation of the proposed project.
Negligible	There would be a negligible change (±10 percent) in the number of infrastructure facilities and management practices affecting opportunity for salmonid passage and rearing.
Minor	There would be a minor change (±11 - 25 percent) in the number of infrastructure facilities and management practices affecting opportunity for salmonid passage and rearing.
Moderate	There would be a moderate change (± 26 - 50 percent) in the number of infrastructure facilities and management practices affecting opportunity for salmonid passage and rearing.
Major or Substantial	There would be a major or substantial change (> 50 percent) in the number of infrastructure facilities and management practices affecting opportunity for salmonid passage and rearing.
Criteria: Areal Extent of Potential Rearing Habitat in Project Area **Source**: Endangered Species Act (federal and California), Magnuson-Stevens Fishery Conservation and Management Act, Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Watershed, Supra-Regional (central Coast ESU) **Duration**: Short-Term, Long-Term	
No Impact	There would be no potential for impact to salmonid estuarine rearing habitat associated with implementation of the proposed project.
Negligible	There would be a barely detectable change (≤ 10 percent) expected in areal extent and connectivity of appropriate edge microhabitat in potential estuarine rearing areas relative to the extent of edge microhabitat currently existing. Would have no detectable effect on watershed population dynamics.
Minor	There would be a measurable change (> 10 percent and ≤ 25 percent) expected in the areal extent and connectivity of appropriate edge microhabitat in potential estuarine rearing areas relative to the extent currently existing. May have a detectable effect on watershed population dynamics.
Moderate	There would be an appreciable change (> 25 percent and ≤ 50 percent) expected in the areal extent and connectivity of appropriate edge microhabitat in potential estuarine rearing areas relative to the extent currently existing. May have a measurable effect on watershed population dynamics.
Major or Substantial	There would be a major or substantial change (> 50 percent) expected in the areal extent and connectivity of appropriate edge microhabitat in potential estuarine rearing areas relative to the extent currently existing. May have an appreciable effect on watershed population dynamics.

California black rail (state threatened) and California clapper rail (federally and state-listed endangered)

- Marsh and upland ecotone habitats are identified as Critical Resource objectives for the proposed project, in part because of their importance to these federally and state-listed bird species.
- The proposed project has the potential to affect rails, because of their affinity for tidal marsh habitat.
- Analysis of potential impacts during construction focuses on avoiding construction during the breeding period (February 1 through August 15) in areas with clapper rails or observing setbacks when there are no seasonal restrictions. Setback requirements developed by CDFG for black rails are 250 feet from occupied habitat.
- Because California clapper rails (*Rallus longirostris obsoletus*) have not been sighted in the Project Area since 2001 and did not appear to breed there even when present, this portion of the analysis focuses on California black rails (*Laterallus jamaicensis coturniculus*).
- Analysis of potential impacts to rail habitat under the various alternatives focuses on changes in acreage of habitat, with "appropriate" habitat defined as meeting the following criteria based on information in ARA et al. (2003). Acreage of areas that meet these criteria are calculated and summed under the various alternatives to semi-quantitatively assess potential habitat changes that would occur as part of the proposed project (Table 73).
  - *Breeding Habitat*: California black rails breed in Tidal Salt Marsh-High or high marsh habitat. They prefer fully tidal Mid- and High Tidal Salt Marsh "patches" with dense vegetation cover that are preferably larger in size, contiguous, and broader in configuration (Evens et al. 1989, Flores and Eddleman 1993, Evens et al. 1991, Evens and Nur 2002)
  - *Foraging Habitat*: Black rails forage in the high marsh plain (J. Evens, ARA, *pers. comm*.)
  - *High Tide Refugia*: During extreme high tides, these birds, which are relatively poor flyers, seek refuge in Upland Ecotone or higher elevation areas such as levees that are not submerged during some of the highest high tides (>7 feet MLLW). The risk of predation increases when vegetation cover is sparse or of short height.

  - *Protection from Predators*: Refugia needs to have little to no potential for access by predators such as red fox (*Vulpes vulpes*), feral cats, dogs, and other predatory mammals. The best areas have no levees, riprap, or upland areas bordering urban or rural residential areas that could allow egress of predatory mammals such as red fox, feral cats, and dogs or have buffers that protect rails from mammals and avian predators.
- Under some alternatives, there is a potential for short-term impacts relating to the length of time that would be required for vegetation communities to undergo the transition from pasturelands to more unmanaged habitats, including establishment and development of any new tidal marsh areas.

TABLE 73. SPECIAL STATUS WILDLIFE SPECIES - RAILS

Source: Endangered Species Act (federal and California), Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed (southern portion of Tomales Bay), Regional (San Francisco Bay region) **Duration**: Short-Term, Long-Term	
No Impact	There would be no potential for impact to rails associated with implementation of the proposed project.
Negligible	There would be a negligible change (≤ 1 percent) expected in the areal extent of appropriate habitat. Would have no detectable effect on Project Area, watershed, or regional distribution of species.
Minor	There would be a minor change (> 1 percent and ≤ 10 percent) expected in the areal extent of appropriate habitat. Would have a detectable effect on Project Area/watershed distribution of species, but not on regional distribution.
Moderate	There would be a moderate change (> 10 percent and ≤ 25 percent) expected in the areal extent of appropriate habitat. Would have a measurable effect on Project Area/watershed distribution of species and possibly a detectable effect on regional distribution.
Major or Substantial	There would be a major or substantial change (> 25 percent) expected in the areal extent of appropriate habitat. Would have a major or substantial effect on Project Area/watershed distribution of species and possibly a measurable effect on regional distribution.

Other Special Status Species

Most of the other federally and state-listed endangered and threatened species are only occasional visitors or vagrants to the Project Area, with the exception of peregrine falcon, a state endangered species and federally delisted species that has been regularly observed foraging over the Project Area. Analysis for these species focuses on how the proposed project would affect incidental use. These species include California freshwater shrimp (*Syncaris pacifica,* FE; common upstream in freshwater portions of Lagunitas Creek, rare in Project Area); California brown pelican (*Pelicanus occidentalis californicus*, FE; foraging on Lagunitas Creek shoreline); Least Bell's vireo (*Vireo bellii pusillus*, FE, SE; extremely rare vagrant in riparian habitat); green sturgeon (*Acipenser medirostris*, FT; forages rarely in Lagunitas Creek); peregrine falcon (*Falco peregrinus*, SE, former FD; regularly observed foraging over the Giacomini Ranch and undiked marsh); sandhill crane (*Grus canadensis*, ST; very rare visitor to wet pastures in Giacomini Ranch); and bank swallow (*Riparia riparia*, ST; rare transient over Giacomini Ranch in fall). In addition, analysis also includes species that are not federally or state-listed as endangered or threatened, but that have or have had during the planning process some listing status and are known to occur in the Project Area. These species include: northwestern pond turtle (*Clemmys marmorata marmorata*, former FSacSC), southwestern river otter (*Lontra canadensis sonorae*, CSC), and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*, former FSacSC). Impact thresholds are based on qualitative evaluation of the potential for impact to use of the Project Area during both construction and post-construction phases under the various alternatives (Table 74).

TABLE 74. SPECIAL STATUS WILDLIFE SPECIES – OTHER SPECIES

Source: Endangered Species Act (federal and California), Migratory Bird Treaty Act, Park Service Management Policies, CCC/LCP Zone II, Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area, Watershed, Regional **Duration**: Short-Term, Long-Term	
No Impact	There would be no potential for impacts to use of the Project Area by other federally and state-listed special status species associated with construction or implementation of the proposed project.
Negligible	There would be a negligible potential for impacts to use of the Project Area by other federally and state-listed special status species associated with construction or implementation of the proposed project. Would have no measurable effect on use of Project Area or watershed.

TABLE 74. SPECIAL STATUS WILDLIFE SPECIES – OTHER SPECIES

Minor	There would be a minor potential for impacts to use of the Project Area by other federally and state-listed special status species associated with construction or implementation of the proposed project. Would have a measurable effect on use of Project Area, but not on watershed use.
Moderate	There would be a moderate potential for impacts to use of the Project Area by other federally and state-listed special status species associated with construction or implementation of the proposed project. Would have an appreciable effect on use of Project Area and a detectable effect on use of the watershed.
Major or Substantial	There would be a substantial or major potential for impacts to use of the Project Area by other federally and state-listed special status species associated with construction or implementation of the proposed project. Would have a substantial effect on use of Project Area and a measurable effect on use of the watershed.

Impact Analysis

TABLE 75. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR FISH AND WILDLIFE RESOURCES

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
High Value Wildlife Habitats					
Construction	Negligible Adverse	Negligible Adverse	Minor Adverse	Minor Adverse	Minor Adverse
Short-Term	Negligible Adverse	Negligible Adverse	Negligible Adverse	Moderate Adverse	Moderate Adverse
Long-Term	Minor Beneficial	Moderate Beneficial	Major Beneficial	Major Beneficial	Major Beneficial
Changes in Wildlife Use					
Construction	Negligible Adverse	Negligible Adverse	Minor Adverse	Minor Adverse	Minor Adverse
Short-Term	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial	Minor Adverse	Minor Adverse
Long-Term	Negligible Beneficial	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Invasive Wildlife Species					
Short-Term/Long-Term	Negligible Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse
Wildlife Conditions in the Watershed					
Short-Term	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial
Long-Term	Negligible Beneficial	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Special Status Species					
California Red-legged Frog					
Construction	Negligible Adverse	Negligible Adverse	Minor Adverse	Minor Adverse	Minor Adverse
Short-Term	Negligible/ Minor Adverse	Negligible/ Minor Adverse	Minor Adverse	Moderate Adverse	Moderate Adverse
Long-Term	Minor Adverse	Minor Adverse	Negligible/ Minor Adverse	Minor/ Moderate Adverse	Minor/ Moderate Adverse
Tidewater Goby					
Construction	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Short-Term	Negligible Beneficial	Minor Beneficial	Moderate Beneficial	Moderate Adverse	Moderate Adverse
Long-Term	Moderate Beneficial	Moderate Beneficial	Major Beneficial	Major Beneficial	Major Beneficial

TABLE 75. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR FISH AND WILDLIFE RESOURCES

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Salmonids					
Construction	Negligible Adverse	Negligible Adverse	Negligible Adverse	Negligible Adverse	Negligible Adverse
Passage and Rearing Conditions	Negligible Beneficial	Minor Beneficial	Moderate Beneficial	Major Beneficial	Major Beneficial
Rearing Habitat Extent: Short-Term	Negligible Beneficial	Minor Beneficial	Minor Beneficial	Moderate Beneficial	Moderate Beneficial
Rearing Habitat Extent: Long-Term	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	Major Beneficial	Major Beneficial
Black and Clapper Rail					
Construction	Negligible Adverse	Negligible Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Short-Term	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial	Negligible Beneficial
Long-Term	Minor Beneficial	Major Beneficial	Major Beneficial	Major Beneficial	Major Beneficial
Other Special Status Species					
Construction	Negligible Adverse/ No Impact	Negligible Beneficial/ Moderate Adverse	Negligible Beneficial/ Moderate Adverse	Negligible Beneficial/ Moderate Adverse	Negligible Beneficial/ Moderate Adverse
Short-Term/Long-Term	Negligible Beneficial / Moderate Adverse	Minor Beneficial/ Moderate Adverse	Minor Beneficial/ Moderate Adverse	Minor Beneficial/ Moderate Adverse	Minor Beneficial/ Moderate Adverse

No Action Alternative

Analysis: The effects of the No Action Alternative on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from moderate adverse to minor beneficial (Table 75). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities. Agricultural infrastructure would largely remain, although most agricultural management practices such as mowing, ditch dredging, and irrigation would be discontinued. There is a potential for leased grazing through a separate environmental review process. However, if such management were to be instituted the Seashore would impose setbacks from creeks, riparian areas, and certain wetland areas, as well as restrict the intensity, duration, and timing of grazing as to limit natural resource degradation.

Wildlife Habitats and General Wildlife Use – Project Implementation: Over the long-term, the No Action would be expected to have minor beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some very negligible adverse impacts during construction of the 11-acre wetland restoration/mitigation component. Under this alternative, the Giacomini Ranch would largely remain grassland, although it would change in nature due to the elimination of grazing or reduced grazing intensity and the elimination of intensive agricultural management practices. Depending upon a number of factors that would probably vary spatially (e.g., future grazing intensity, nutrient concentrations in soils, and influence of salts through surface waters or groundwater), a large proportion of the pastures could respond to reduced grazing and management with a rapid increase in vegetation biomass and plant height, particularly of weedy, ruderal species such as common velvet grass (*Holcus lanatus*) and milk thistle (*Silybum marianum*). This same phenomenon has been documented in other grazed areas where grazing has been removed, such as

vernal pool areas and a Seashore-owned ranch near Drake's Beach. At some point in the future, grasslands within the Project Area may change yet again to communities dominated by both native and non-native species once nutrient pools within soils are reduced to levels more characteristic of non-agricultural lands. However, with the exception of perhaps more saline areas, native grasslands would be unlikely to establish naturally in these types of wet conditions due to the overwhelming number of non-native grass species that dominate most grassy wetland areas in California.

The acreage of wetland and riparian habitats would increase in the Giacomini Ranch, because of the 11-acre wetland restoration component, the reduced grazing pressure on riparian habitat, and the expansion of Freshwater Marsh habitats with the elimination of frequent ditching to drain pastures. These factors would potentially cause a minor increase of approximately 6 percent in High Value Wildlife Habitats such as Tidal Waters, Forested and Scrub Shrub Riparian, Tidal Brackish Marsh, Tidal Salt Marsh, and Tidal Salt Marsh-High/Upland Ecotone relative to baseline conditions, despite the fact that most of the Giacomini Ranch would remain grassland and potentially convert into a less managed type of grassland that would offer less value to at least certain wildlife species. While, in general, discontinuation of agricultural management may benefit most High Value Wildlife Habitats, ultimately, the discontinuation of dredging could reduce Freshwater Marsh habitat in the East Pasture, because ditches might begin to fill in with sediments deposited during overbank flooding.

In Olema Marsh, where there is no agricultural use, conditions would be expected to remain fairly similar to baseline conditions. Currently, Open Water and Freshwater Marsh habitats appear to be expanding at the expense of Forested and Scrub Shrub Riparian habitats, because of steadily increasing water levels in the marsh that has resulted from poor drainage through the Levee Road culvert.

The small increase in High Value Wildlife Habitats would have a negligible beneficial effect over the long-term on use of the Project Area, with use by common and special status wildlife species potentially negligibly increasing. The largest beneficial effects in wildlife use under this alternative would be expected to come from increased use of expanded Forested and Scrub Shrub Riparian habitat by resident and Neotropical migrant passerines or riparian bird species.

Discontinuation or reduction of grazing under the No Action Alternative would increase the areal extent and structural complexity of riparian habitat along the edges of the Project Area. As riparian habitat expands following elimination of trimming and grazing, an increase in foraging and breeding habitat for riparian associates (residents and Neotropical migrants) would be expected. Riparian habitat provides structural refuge critical to passerine birds, including salt marsh common yellowthroat; mammals (southwestern river otter, dusky-footed woodrat, and black-tailed deer), and amphibians (California red-legged and Pacific tree frog). Many vertebrate species utilize tidal salt marsh and freshwater marsh habitats for foraging, but also require nearby high-quality riparian forest or scrub shrub habitat for resting and refuge.

In terms of acreage, the largest gain in High Value Wildlife Habitat under the No Action Alternative would occur as a result of the wetland mitigation/restoration component, which would restore 11.4 acres of Tidal Salt Marsh and Tidal Salt Marsh-High/Upland Ecotone, as well as Tidal Brackish Marsh and Tidal Open Water. These habitats primarily benefit salt marsh dependent bird species, such as California black rail, California clapper rail, and saltmarsh common yellowthroat, but would also benefit generalist waterbirds such as great egret, and generalist shorebirds such as willet, godwit, and greater yellowlegs. Salt marsh also provides foraging habitat for raptors species - such as short-eared owl, white-tailed kite, northern harrier, and peregrine falcon - drawn to the site by small vertebrates such as California voles, shrews, and garter snakes. However, the small size of this restoration component may limit its ability to attract new species or increase numbers of existing ones. Some species such as California clapper rail require larger expanses of unfragmented marsh habitat before they will colonize. Certain special status fish species such as tidewater goby and salmonids may use the tidally reconnected portion of the East Pasture Old Slough at times for refugia, but the size of this off-stream channel again minimizes its usefulness for many wildlife species.

Changes in management would also benefit avian and mammalian species associated with aquatic habitats. Foraging habitat for some waterfowl and marsh-associated passerines would increase as additional Freshwater Marsh and Wet Meadow habitats developed on the fringe where frequent ditching has precluded their presence. The seasonal abundance of migratory waterfowl in ditches, sloughs, and northeast corner of East Pasture would be expected to continue under the No Action Alternative, although discontinuation of dredging could affect attractiveness of this habitat over the long-term. The Muted Tidal Brackish Marsh - Mudflat/Panne in the southeastern portion of the East Pasture would continue to attract moderately high numbers of shorebirds and waterfowl during the winter and provide alternate habitat for these species during high tide

conditions within Tomales Bay. Southwestern river otter, which reappeared in the vicinity of the Project Area during the past several decades, would continue to expand its presence in the Project Area, moving between Lagunitas Creek, Giacomini Ranch, and Olema Marsh.

In the West Pasture freshwater marsh, the current conversion of the northern portion of the marsh from Freshwater Marsh to Muted Tidal Brackish Marsh would continue. In 2003, the culverts on Fish Hatchery Creek at the West Pasture north levee collapsed, allowing a greater range of tidal flows into the pasture Following replacement of the culverts and installation of modified one-way tidegates, the tidal range within the West Pasture compressed, but still appears to be higher than prior to the culvert/tidegate failure. During higher high tides, particularly during the winter, saltwater can flow into the marsh, where it appears to pond for several months due to the poor drainage conditions. Since 2003, then, maximum and average salinities within the marsh have increased and have started to convert at least the lower elevation northern portions of the marsh to Muted Tidal Brackish Marsh. This conversion may have possibly already caused impacts to the California red-legged frog, as annual surveys since 2003 have yet to document the same high numbers as were observed during the baseline study year in 2001 (G. Fellers, USGS, unpub. data). Numbers of these frogs would be expected to continue to remain low under the No Action Alternative, because of the habitat conversion already occurring. This issue is discussed further under the Special Status Species portion of this section. While negatively affecting frogs, the conversion of this habitat would benefit passerine bird species, such as salt marsh common yellowthroat and red-winged blackbird, which use tall vegetation for nesting and resting habitat while maintaining close proximity to more open foraging habitat.

In general, amphibians and reptiles would be the most adversely affected by the No Action Alternative. These species are predominantly freshwater species that would be negatively affected by conversion of Freshwater Marsh to brackish or tidal habitats in the West Pasture and the discontinuation of agricultural management practices such as levee maintenance, dredging and irrigation that maintained Open Water areas in ditches in the East Pasture. In addition to the red-legged frog, another special status species, the Northwestern pond turtle, would be adversely affected by these changes, with barely detectable to measurable changes in habitat and numbers expected. These same factors would also, however, have a beneficial effect on the amphibian and reptile community by decreasing the extent of appropriate habitat for a non-native predator of the red-legged frog, the bullfrog, which occurs in the East Pasture, Tomasini Creek, and the West Pasture. Over the long-term, deterioration of levees would potentially increase tidal influence in the East and West Pastures and thereby increase impacts to the red-legged frog, pond turtle, and bullfrog populations.

Increasing water levels in Olema Marsh and the associated decline in riparian habitat would result in a decline in riparian-associated avian species (e.g. warbling vireo, Swainson's thrush, and Wilson's warbler) at the marsh, although there may be an increase in species (e.g. swallows) that nest in cavities in snags and forage over the expanding Freshwater Marsh. The increasing water levels and predicted subsequent expansion of Freshwater Marsh would continue to support marsh wrens, song sparrows, salt marsh common yellowthroat, and Virginia rails, as well as migratory waterfowl. The expansion of freshwater marsh may increase breeding potential for waterfowl species such as mallard, gadwall, and Canada goose in Olema Marsh. In addition, it could increase habitat for California red-legged frog and bullfrog, both of which currently occur in the marsh.

Overall, the elimination of intensive agricultural management may benefit avian species by resulting in increased grass heights and introduction of additional food resources. Higher grass heights would increase potential nesting habitat for certain ground nesting species, especially near water in ditches. Species that may benefit include waterfowl (e.g. mallard, gadwall) and passerines (e.g. song sparrows, marsh wrens). Other passerines, which are considered short-grass specialists such as savannah sparrows and western meadowlarks, would probably decrease in abundance with discontinuation of mowing and a reduction in grazing. Raptors such as northern harrier may have increased foraging opportunities with greater grass heights as small mammal populations respond to more cover. A change in vegetative species composition to non-native species, i.e. thistles, may also increase foraging opportunities for avian species such as American and lesser goldfinch. The increase in vegetative cover resulting from eliminating intensive agricultural management practices may also benefit California black rail by increasing upland refugia and providing cover from predators during high tides.

Wildlife Habitats and General Wildlife Use – Long-Term Changes: As discussed earlier, over the long-term, the weedy, more ruderal grassland that would develop either under reduced or no grazing conditions would be expected to convert into a less densely vegetated grassland that supports both native and non-native species. This conversion may be stymied by the steady deterioration or abrupt breaching of the levees on the East and West Pastures, which would not be maintained. With loss of the levees, grasslands would begin converting to

brackish and tidal marsh habitats, thereby attracting a different assemblage of wildlife species that might more closely resemble those expected for Alternatives A through D. These brackish and tidal marsh habitats would possibly continue to evolve in the future in response to sea level rise, which may be increasing at a much greater rate than was originally predicted (Overpeck et al. 2006). The projected rate of 3 feet of sea level rise by 2100 could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions to intertidal emergent wetland habitats. This shift would attract specific avian species such as diving ducks, dabbling ducks, marsh-associated passerines, and other aquatic species.

As there would be no change in public access facilities under the No Action Alternative, no detectable change would be expected in terms of visitation and, consequently, the potential effects on visitors on wildlife use, success of breeding efforts, and other behaviorial variables relative to baseline conditions.

Wildlife Habitats and General Wildlife Use – Construction: Construction of the No Action Alternative would have only very negligible adverse effects, if any, on High Value Wildlife Habitats and use by common wildlife species, however, there could be minor to moderate adverse impacts on special status species such as tidewater goby. The area where the wetland mitigation/restoration component would be constructed currently has Non-Tidal Brackish Marsh and Pasture/Grassland habitats. Wildlife use of this area is generally low, although the East Pasture Old Slough pond that would be tidally reconnected supports low to moderate numbers of waterfowl, high numbers of estuarine fish species such as threespine stickleback, and, as of 2006, very low numbers of tidewater goby. Because of its proximity to the undiked marsh where California black rail occur, construction would not be implemented until after August 31. Potential mitigation measures are discussed in a separate sub-section below.

Invasive Wildlife Species: The No Action Alternative would have a negligible adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions. Under this alternative, most of the invasive species already present in the Project Area would be expected to remain, with a possible expansion into new areas by some of the species. The continued dominance of the Giacomini Ranch by grassland habitats would result in the No Action Alternative having little to no effect on terrestrial invasive species, such as red fox and wild turkey. These species would continue to access East and West Pasture for foraging, resting, and other purposes. In addition, because of the proximity of the Project Area to rural residential areas, maintenance of grassland conditions and levees would also encourage the presence of feral cats and dogs, as well as red fox, that could prey on both adult and young. Feral cats in particular have a documented and adverse effect on birds, amphibians and small mammals in native ecosystems (Winter and Wallace 2006, Liberg 1998). Red fox and feral cats, as well as Norway rats, have been implicated strongly in the decline of rail populations n San Francisco Bay. Monitoring throughout the Seashore for impacts of feral cats and dogs is ongoing (N. Gates, wildlife biologist, Seashore, *pers. comm*.). Should impacts on special status species or other species of concern in the Project Area be detected, removal of feral animals will be implemented as mandated by Park Service Management Policies (Section 4.4.2.1).

Most of the increase in numbers or number of invasive species would come from estuarine-dependent invasive species that would benefit from the very small increase in tidal and muted tidal habitats. Most of the Giacomini Ranch would remain leveed under this alternative, but approximately 11.4 acres would be converted to tidal habitats through a small wetland restoration/mitigation component. Species with potential to invade the restored habitat include animals already present within the Project Area and Tomales Bay watershed, as well as potentially animals not yet found in the watershed but that are likely to invade this estuary in the future because of their rapid spread within other regional estuaries such as San Francisco Bay.

Estuarine-dependent invasive species currently in the Project Area and watershed that could increase negligibly in numbers or areal extent from the No Action Alternative include: European green crab, present in large numbers just north of the Project Area and observed in Fish Hatchery Creek in the West Pasture; yellow-fin goby, currently inhabiting Lagunitas Creeks at low densities; and Korean shrimp, documented from both Lagunitas and Tomasini Creeks. The New Zealand burrowing isopod (*Sphaeroma quoyanum*) may also occur in intertidal creeks in the undiked marsh north of Giacomini Ranch, but it has not been positively identified.

The No Action Alternative would have some effect on freshwater and terrestrial invasive species, as well. Under the No Action Alternative, the northern half of the freshwater marsh in the West Pasture would continue to convert to Muted Tidal Brackish Marsh habitat. In addition to California red-legged frog and Pacific tree frog, this marsh also supports an unknown number of bullfrogs, which were sighted for the first time in 2006 (P. Kleeman, *USGS, pers. comm*.). Degradation of the levees over the long-term could increase saltwater intrusion into freshwater habitats and decrease the potential habitat available for this freshwater species.

Other invasive freshwater aquatic species include mosquitofish and crayfish, both of which are currently found within the Project Area. Mosquitofish have also been found in the more saline waters of Lagunitas Creek and the undiked marsh north of Giacomini Ranch (NPS, unpub. data), suggesting that this species can tolerate at least brackish conditions. While changes in some portions of the Giacomini Ranch might be detrimental to freshwater species, the current trend in Olema Marsh of conversion of riparian habitat to Freshwater Marsh and permanently flooded Open Water would be expected to continue, thereby maintaining or even increasing numbers of bullfrogs. Mosquitofish and crayfish have not been observed in this system, but the marsh is difficult to survey, so it is possible that at least mosquitofish occur there.

Wildlife Conditions in the Watershed: Only a very negligible beneficial effect would be expected in terms of support of wildlife species in southern portion of the Tomales Bay watershed, with most of the benefits over the short-term coming from discontinuation of agricultural management practices in the Project Area that affect conditions in Lagunitas and, ultimately, the bay. Retention of the levees would minimize potential export of sources of carbon to downstream water, as well as access by marine and estuarine organisms into the Giacomini Ranch interior. Watershed habitat quality would be improved by discontinuation of levee maintenance, withdrawal of water for irrigation, infrequent pumping of waters from the ranch into Lagunitas Creek, and crossing of Lagunitas Creek by cattle.

California red-legged frog: The No Action Alternative would have a negligible adverse effect on California red-legged frog breeding habitat units and distribution of the species in the Point Reyes Peninsula Core Area, but a minor adverse effect on distribution of red-legged frogs in the Project Area. Over the long-term, impacts could possibly increase to minor, because degradation of the levees and sea level rise could cause a measurable effect on breeding habitat units and regional distribution. Impacts during construction of the wetland mitigation/restoration component in the northern portion of the East Pasture where no breeding has been documented would be expected to be non-existent or very negligible.

Baseline studies documented two areas that provide breeding habitat for red-legged frog. The West Pasture freshwater marsh is approximately 7.25 acres in area and has supported reproduction in 4 of the last 5 years (no reproduction observed in winter 2002-03). Breeding also has sporadically occurred in Fish Hatchery Creek, creating another 1.0 acre of breeding habitat in the West Pasture. The Olema Marsh provides a complex and dense habitat known to support red-legged frog breeding habitat. The vegetation density and site complexity have made it impossible to conduct a survey to estimate use. Bullfrogs are also known to occur in large numbers within the pond. Breeding habitat within the Olema Marsh is assumed to comprise all of the areas with Freshwater Marsh and Open Water, which total 39 acres. There is no documented breeding habitat in the East Pasture, although a few adult frogs were observed during baseline surveys (Fellers and Guscio 2002).

Numbers of individuals within the West Pasture freshwater marsh has fluctuated sharply during the limited years of monitoring, potentially in response to the failure of the tidegate and the apparent increase in tidal influence even after the tidegate was repaired. This issue is discussed in more detail under Water Quality in Chapter 3. During 2001-2002, the year prior to the tidegate failure, egg masses totaled 45, and number of estimated adults totaled 90 (Fellers and Guscio 2002). Only a few adults and no egg masses or tadpoles were observed in the West Pasture freshwater marsh and Fish Hatchery Creek during the 2003-2004 season after the tidegate was repaired (G. Fellers, USGS, *pers. comm*.). Since then, frog numbers have rebounded slightly, but not to 2001-2002 levels (Table 19). In 2004-2005, approximately 10 adult red legged frogs were detected, but no egg masses were observed (G. Fellers and P. Kleeman, USGS, unpub. data). In January 2006, a survey following extensive flooding, including multiple breaches of the West Pasture levees found 12 adult frogs and 15 egg masses (G. Fellers and P. Kleeman, USGS, *pers. comm*.).

Under stable environmental conditions, numbers of individuals as measured by egg masses within established habitats such as Cemetery Pond have remained fairly stable from year to year, varying only by 25 percent during the years of monitoring, which suggests that, under optimal conditions, the range of natural variability might be fairly low (G. Fellers and P. Kleeman, USGS, wildlife biologists, *pers. comm*.). The amount of monitoring in the West Pasture freshwater marsh prior to the tidegate failure is limited (one year), so the ability to interpret the stability of the population prior to this event is reduced. No frogs were observed in this marsh during baseline studies conducted in 1993 as part of the feasibility study, when red-legged frog was first documented to be on the Giacomini Ranch (PWA et al. 1993). Certainly, the potential for red-legged frog was much lower prior to construction of the levees in the 1940s, with aerial photographs depicting this area as intertidal emergent marsh. Construction of the levees has created an artificial freshwater regime in what was historically a tidal marsh complex, although pockets of freshwater marsh have probably always existed on the

perimeter where abundant surface water and groundwater flow from the Inverness Ridge and Point Reyes Mesa have been present.

While 2001-2002 cannot be necessarily interpreted as baseline population numbers for this marsh due to the lack of consecutive years of survey, it is likely that the greater influx of saltwater into Fish Hatchery Creek and the freshwater marsh in the West Pasture that has occurred after the tidegate repair has had some effect on this population. Interestingly, saltwater intrusion into the West Pasture currently appears to be controlled by extreme high tide events and long residence time during winter months, not by evapotranspiration during the summer months, as might be expected. Based on continuous salinity monitoring within the marsh, most of this tidal influence appears to be during the winter when the extreme tides are highest, with salinities actually dropping during the spring and summer. Extreme high tides in Tomales Bay exceeding approximately 6.2 ft NAVD88 cause water levels within the muted tidal West Pasture to increase to 5.25 ft NAVD88, the uppermost part of the tidal range in the pasture, which then allows tidal waters to overbank flood and flow into the central and lowest elevations portions of the freshwater marsh. While salinities have not reached the levels recorded during the period that the tidegate had failed since its repair, red-legged frogs actually continue to breed in some of the highest salinity areas, which are the deepest portions of the depressional basin in which the freshwater marsh is located (P. Kleeman, USGS, *pers. comm*.). It is possible that frogs are taking advantage of stratification of freshwater over denser, saltier waters.

This pattern of saltwater intrusion is causing the northern half of the marsh to convert from Freshwater Marsh to Muted Tidal Brackish Marsh. The southern half does not appear to be affected by salinity intrusion, perhaps because elevations are slightly higher, which reduce the reach of tides, and because of high perennial freshwater inflow from the 1906 Drainage and groundwater flow from the Inverness Ridge. The Park Service is conducting a habitat enhancement project in 2006 that would slightly expand higher elevation Freshwater Marsh habitat in this area by excavating fill that has been placed directly adjacent to the Lucchesi residence. This project would expand Freshwater Marsh by approximately 0.4 acres. In addition, continued increases in water levels in Olema Marsh due to poor drainage would continue to convert Forested and Scrub Shrub Riparian habitat to Freshwater Marsh and Open Water habitat, perhaps providing a very negligible increase in breeding habitat for red-legged frog. Over the short-term, this alternative would be expected to have slightly beneficial effects on non-breeding habitat through maintenance of non-tidal grasslands and expansion of riparian habitat along the perimeter.

While the levees and infrastructure would remain under the No Action Alternative, discontinuation of levee maintenance would result in slow decay of levee and tidegate facilities. The slow decay or sudden breach during large storm events of these facilities would allow for greater tidal flooding and thereby further reduce viable red-legged frog breeding habitat in the West Pasture. Under full tidal conditions, an additional 1.5 acres of breeding habitat would be lost through conversion to brackish or saline habitats. This impact could be increased over the long-term by sea level rise, which may be rising at a much higher rate than originally predicted. If the levees decayed or abruptly breached, impacts on red-legged frog would be expected to be minor, with the exact effect dependent on a number of factors, including annual variability in rainfall and runoff conditions and possible passive creation of Freshwater Marsh in other areas through discontinuation of agricultural management.

Effects on red-legged frog during construction of the wetland restoration/mitigation component would be expected to be non-existent or very negligible. There is no breeding habitat in the northwestern corner of the East Pasture, and this area does not represent key non-breeding habitat, although adult frogs have been sighted in the East Pasture Old Slough Pond on occasion. Mitigation measures are discussed in a separate sub-section below.

Tidewater goby: The No Action Alternative would have very negligible beneficial effects on tidewater goby in the Project Area through a potential increase in quality of existing habitat, although, over the long term, slow decay or sudden breaching of levees could increase the benefits to tidewater goby by considerably increasing the amount of available habitat. Impacts during construction would be expected minor to moderate at most, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Within the Project Area, Acreage of existing tidewater goby habitat in the Giacomini Ranch totals 11.3 acres. This species occurs primarily in a section of Tomasini Creek that has been bermed to run against the base of Point Reyes Mesa until it drains into Tomales Bay. The creek supports both open water and vegetated sections. Most of the creek bottom is muddy or a combination of clay and silt (G. Kamman, KHE, *pers. comm*.). The flashboard dam and culvert structure is malfunctioning and allows modified two-way flow, such

that the creek is influenced by the full upper range of high tides, but does not drain completely during low tides. This maintains permanent ponding or subtidal conditions within the creek, which may have become intertidal mudflat during low tides if it had been allowed to drain completely. The tidegate, along with natural gravel bar features create residual brackish pool habitat that provides habitat for the tidewater goby, despite the fact that the substrate and flow conditions are probably not optimal.

In addition, tidewater goby has been documented in a diked slough in the West Pasture. This slough is not a fluvial or creek system such as Tomasini Creek, but rather appears to drain freshwater surface run-off from a seasonally flowing seep present on the Gradjanski property, as well as surface run-off from overbank flooding of the pasture by Fish Hatchery Creek. It receives tidal influence from Fish Hatchery Creek, which has muted tidal flows with lower amplitude than Tomasini Creek. As with Tomasini, substrate conditions are suboptimal, with the surface substrate being muddy or a combination of clay and silt.

In 2006, tidewater goby were also found in non-tidal portions of the East Pasture. During the December 2005 storm, these fish may have been washed into the East Pasture Old Slough from Tomasini Creek when the Tomasini Creek levee breached, or they may have entered the slough from the bay. During the storm, the entire northern portion of the East Pasture was flooded and connected through elevated surface waters with Lagunitas Creek and Tomales Bay. Tidewater goby have been found outside the mouth of Tomasini Creek. Lastly, these fish may have entered the East Pasture Old Slough Pond through the one-way tidegates if the tidegates were malfunctioning and allowing water in as well as out. During surveys, dead marine fish species were discovered in the pond, suggesting that gobies probably entered from the Lagunitas Creek side of the pond. The pond is bermed off from the rest of the East Pasture Old Slough, because the Giacominis once reputedly used this area for hunting. This pond consistently has brackish water salinities, probably because the tidegates leak. As with Tomasini Creek and the West Pasture Old Slough, substrate conditions are suboptimal, with the surface substrate being muddy or a combination of clay and silt.

Numbers of tidewater goby in the Project Area have also been relatively low within each of these sites, ranging from five to 22 at most. These sites represent the only known occurrence of this species in the Tomales Bay watershed, as, prior to 2002, the species had last been sighted in the bay in 1953. Genetic analyses indicate that this population is genetically distinct from the nearest existing occurrences of tidewater goby at Salmon Creek Marsh and Rodeo Lagoon (Jacobs and Earl 2005).

Following project implementation, the No Action Alternative would result in negligible beneficial effects in the Project Area on tidewater goby by slightly improving the quality of existing habitats. Tidal reconnection would improve water quality within the East Pasture Old Slough Pond, which, based on observations of dead marine fish during the 2006 sampling, probably has at least periods of sub-optimal water quality. A reduction or removal of grazing would increase water quality within the West Pasture Old Slough, improving the quality of existing habitat for the group of fish first observed in 2005. This alternative would be expected to have only a very negligible to no effect on Tomasini Creek other than the discontinuation of any levee maintenance practices, although this levee has not been actively maintained for many decades.

Over the long-term, slow decay or abrupt breaching of the Giacomini Ranch levees would have the potential to increase habitat for tidewater goby through creation of more tidal channels and side channels in the East and West Pastures. This trend would be intensified by sea level rise, which may be increasing at a much higher rate than originally predicted. The projected rate of 3 feet of sea level rise by 2100 (Overpeck et al. 2006) could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions to intertidal emergent wetland habitats.

Additional benefits from tidewater goby are expected to come from implementation of the captive propagation program in which tidewater goby would be caught, bred in captivity, and reestablished in new habitats within the southern portion of the Tomales Bay watershed. This program is described more in Chapter 2. Over the long-term, the likely reconnection of creeks with their floodplains through levee decay and breaching, combined with the captive propagation program, would increase benefits to a moderate level.

The tidal wetland restoration/mitigation component includes tidal reconnection of the East Pasture Old Slough Pond with Lagunitas Creek and Tomales Bay. As noted above, tidewater goby have recently been found in the East Pasture Old Slough Pond. Mitigation measures are discussed in a separate sub-section below.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: The No Action Alternative would have a very negligible beneficial effect on salmonid rearing and passage habitat in the Project Area. No impacts to at the very most very negligible adverse effects to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration/mitigation component.

As discussed under Chapter 3 and the assumptions portion of this section, salmonids have been detected in several Project Area creeks despite the presence of levees, tidegates, and other hydrologic infrastructure and intensive agricultural management. The Project Area does not represent a potential breeding or spawning area for steelhead, coho or Chinook salmon. These types of salmonids typically breed in the upper portions of the watershed in medium- to high-gradient tributaries. The proposed Project Area represents important feeding habitat for salmonids as they migrate to the ocean. Previous investigations have shown that the Project Area is a primary production zone for neomysid shrimp (Bratovich and Kelly 1988, Pearson 2000) known to be an important food source for the outmigrating smolts in this watershed (Bratovich and Kelly 1988). Smolts may spend days to weeks in estuarine habitat feeding in nutrient-rich areas and growing prior to heading to the open ocean (Reimers 1973, Simenstad et al. 1982, Levy and Northcote 1982). While this is a relatively short period of time, this transitional life stage may have direct implications on the ocean survival of smolts, as there is direct correlation between increased smolt weight lead to higher adult survivorship (Naiman et al. 2002). The importance of estuarine habitats varies between salmonid species, with Chinook typically spending the most time in wetlands before outmigrating to the ocean (Simenstad et al. 1982, Aitkin 1998). The importance for coho salmon appears to be more geographically and temporally variable (Magnusson and Hilborn 2003; Miller and Sadro 2003). Park Service staff has documented the presence of steelhead and coho within the estuarine portions of Lagunitas and Tomasini Creek more than one month after the peak of smolt outmigration.

Steelhead has been documented several times in Fish Hatchery Creek, though no determination of anadromy could be conducted. Steelhead and coho have also been observed several times in Tomasini Creek within the leveed section of the creek. Information on anadromous species runs in Bear Valley Creek is poor, but smolt trapping by the Seashore upstream of Olema Marsh in 1999 netted 21 steelhead – five of which were classified as pre-smolts (Ketcham, *in prep.*). Coho salmon have not been observed, at least in recent times, in the Bear Valley Creek watershed (B. Ketcham, Seashore, *pers. comm*.). Fisheries surveys on the section of Lagunitas Creek Salmonid presence in these watersheds indicates that, while impediments, the levees and tidegate facilities are still allowing some degree of fish passage.

Current conditions limit salmonid habitat to Fish Hatchery Creek (accessed via modified one-way tide gate in West Pasture levee), Tomasini Creek (accessed via malfunctioning tidegates and flashboard dam structure on East Pasture levee), and Bear Valley Creek (accessed via undersized culverts in Levee Road). Fisheries monitoring within the Project Area, as well as within the Lagunitas/Olema Creek watershed, indicate that infrastructure in the Giacomini Ranch and Olema Marsh do not eliminate the potential for passage to the main spawning grounds in the upper watersheds, but likely limit the duration and timing of access to Fish Hatchery and Tomasini Creek. These same levees also eliminate most of the potential for off-channel rearing habitat on Tomasini Creek and Lagunitas Creek. Fish Hatchery Creek is not actually leveed within the West Pasture, although it is infrequently dredged. On Bear Valley Creek, Levee Road, Bear Valley Roads, and their culverts limit both passage and rearing potential, along with the indistinct flow path in Olema Marsh created by excessive impoundment of waters.

Under the No Action Alternative, all levees and hydrologic infrastructure would remain, although they would not be maintained. The largest benefit to salmonids under this alternative would come from improvements in habitat conditions through discontinuation of agricultural management practices such as levee maintenance, dredging, cattle crossing of Lagunitas Creek, pumping of creek water for irrigation, and other factors. This would have a negligible beneficial effect on passage and rearing conditions in the Project Area. The only change in areal extent of refugia habitat would be the tidal reconnection of the East Pasture Old Slough Pond to Lagunitas Creek and Tomales Bay, which would provide a negligible beneficial increase in refugia habitat or Total Aquatic Edge of approximately 3 percent relative to existing conditions over the short-term. There would be no change in Olema Marsh, other than water levels would be expected to continue their rise, which may further affect the ability of salmonids to reach upstream portions of the watershed.

Over the long-term, slow decay or abrupt breaching of the Giacomini Ranch levees would have the potential to increase habitat for salmonids through creation of more tidal channels and side channels in the East and West Pastures and thereby increase benefits for salmonids. While these channels could provide more refugia and foraging habitat for salmonids, levee failure could also create an ecological sink such that water could flood in,

but not flow out, causing extensive stranding of aquatic species. The potential for this scenario is greater in the West Pasture than the East Pasture. This trend toward tidal reconnection with levee failure would be intensified by sea level rise, which may be increasing at a much higher rate than originally predicted. The projected rate of 3 feet of sea level rise by 2100 (Overpeck et al. 2006) could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions to intertidal emergent wetland habitats.

Construction would have either no impact or very negligible adverse effects on salmonids.

California black rail and California clapper rail: The No Action Alternative would have a minor beneficial effect on California black rail by causing a barely detectable increase in appropriate breeding, foraging, and refugia habitat with restoration of 11.4 acres of mid- and high Tidal Salt Marsh and the continued conversion of northern portions of the West Pasture to more brackish conditions. Impacts during construction would either be non-existent or very negligible, at most.

As of 1994, the undiked marsh north of the Giacomini Ranch appeared to support a breeding population of at least seven pairs of California black rails (Evens and Page 1986; Evens and Nur 2002). Breeding individuals have also been detected in intermittent years at Olema and Bear Valley Marshes, immediately south of the Giacomini Ranch (ARA 2002). During baseline surveys, black rails were detected in the Giacomini Ranch and in Olema Marsh (ARA 2002). Territorial black rails were calling on territories in May-June 2002 and were assumed breeding in the West Pasture freshwater marsh (ARA 2002). Small numbers (1-2 individuals) also occurred within the Project Area in brackish and freshwater marsh (ARA 2002). There is no recent information since 2001-2002 on the number of breeding pairs, although it is possible that numbers have decreased (J. Evens, ARA, *pers. comm.).*

In the early 1900s, when tidal marshes were more extensive, clapper rails were reported as occurring in Tomales Bay (Grinnell and Miller 1944). In 1980, one bird was heard in the portion of the East Pasture adjacent to Tomasini Creek (J. Evens, unpub. field notes). Since then, the species has been largely absent, although individuals were sighted for years in the undiked marsh north of the Giacomini Ranch during fall and winter between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). There are no recent breeding records, however. Except for the "intermittent presence of wandering or wintering birds," the population of clapper rails in Tomales Bay appears to be extirpated (ARA 2002).

Black rails both forage and nest in the mid- to high marsh plain, well above the low marsh and intertidal mudflats favored by clapper rails. During higher high tides, black rails move to higher elevations in marshes or adjacent upland areas to escape floodwaters, because rails are poor fliers and unable to fly long distances. Optimal high tide refugia habitat is not inundated, even during higher high tide water levels, and is well-vegetated with at least medium-sized plants to provide cover from predators that use high tides as an opportunity to prey on rails (J. Evens, ARA, *pers. comm*.). Unlike black rails, clapper rails prefer to forage in low marsh areas with sparse vegetation, mudflats, and tidal sloughs (ARA 2002). Higher marsh areas with dense vegetation are used for nesting and high-tide refugia (Albertson and Evens 2000).

Black rail habitat in the Project Area and adjacent undiked marsh to the north of the Giacomini Ranch currently totals 120 acres, with approximately 39 acres of refugia habitat, some of which is the Giacomini Ranch levees. Within the immediate Project Area, black rail habitat totals approximately 59.3 acres with 32.4 acres of high tide refugia. Clapper rail habitat occurs in the northern portion of the Project Area and the adjacent undiked marsh, totaling at least 116.8 acres of foraging and nesting habitat, in addition to the 39 acres of high tide refugia.

Under the No Action Alternative, approximately 11.0 acres of mid-marsh Tidal Salt Marsh habitat would be created, along with 0.4 acres of high marsh/upland ecotone. The restoration would provide benefits primarily to black rail, although clapper rail could receive negligible benefits from the lower elevation marsh portions, too. While rails do not currently use the East Pasture, the proximity of the restoration area to the undiked marsh makes it more likely that rails might expand into the East Pasture. In addition to the 0.4 acres of high marsh/upland ecotone habitat that would be created, rails could also avail themselves of the nearby Tomasini Creek levee or the newly created high tide refugia in the northeastern portion of the West Pasture during high tide conditions. The Park Service is currently planning a habitat enhancement project that would include approximately 1.0 acres of high tide refugia. This project involves widening and revegetation of the existing north levee of the West Pasture to enhance refugia conditions.

Another change that would benefit California black rail is the continued conversion of the northern portions of the West Pasture, including the freshwater marsh, to Muted Tidal Brackish Marsh. The conversion is discussed in more detail under General Wildlife and California red-legged frog.

In other areas, decreases in rail numbers might be expected from continuation of existing conditions. Potential occurrence of a non-native isopod in the undiked marsh north of Giacomini Ranch could threaten valuable high marsh habitat for black rails adjacent to tidal creeks, because of accelerated rates of bank slumping and creek widening. Also, under this alternative, the West Pasture north levee would not be removed. Rails often use these levees during storms and extreme high tide events. While the levees are well above most of the higher high tides, they are often poorly vegetated due to trampling from cattle and people and are subject to disturbance pressures from people using the existing informal trail to view the rails who may inadvertently flush them into the open where they are vulnerable to predation. In addition, steadily increasing water levels in Olema Marsh, which is causing conversion of riparian to Freshwater Marsh and Open Water habitat, would potentially decrease suitability of this habitat for black rail.

Over the long-term, slow decay or abrupt breaching of the Giacomini Ranch levees would have the potential to increase nesting, foraging, and roosting habitat for rails through creation of more low- and mid-marsh intertidal emergent marsh. This trend toward tidal reconnection with levee failure would be intensified by sea level rise, which may be increasing at a much higher rate than originally predicted. The projected rate of 3 feet of sea level rise by 2100 (Overpeck et al. 2006) could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions to intertidal emergent wetland habitats. While this trend could increase available rail habitat in the Giacomini Ranch, it would potentially decrease habitat and numbers of black rails in Olema Marsh, because of a continued rise in water levels.

Loss of levees from decay or breaching would reduce the amount of high-tide refugia available. Other than the created high tide refugia in the northwestern and northeastern corners of the East and West Pastures, respectively, and possibly portions of the Tomasini Creek levee, most of the remaining refugia during high tides would come from riparian and upland habitat along Sir Francis Drake Boulevard, which might have more problems with disturbance due to the presence of peoples, pets, and other more urban factors. Depending upon the southernmost extent of intertidal marsh formed following levee failure, rails may begin using some of the higher elevation areas in the southern portions of the pastures that would generally be above higher high tides. These areas are also physically linked to road and trail corridors, which increase the potential for disturbance and predation by birds and mammals. However, the quality of high tide refugia under this alternative may not differ substantially from that under existing conditions, which, as noted earlier, consists of poorly vegetated and often highly trampled levees and muted tidal portions of ruderal pastures. Taking these factors into consideration, over the long term, the No Action Alternative would be expected to have at least a moderate beneficial effect on rail habitat and populations.

Creation of the 11-acre marsh at the northeastern corner of the property would require use of equipment within the vicinity of existing rail habitat in the undiked marsh across the Lagunitas Creek channel from the East Pasture. Mitigation measures are discussed in a separate sub-section below.

Other Special Status Species: The effects of the No Action Alternative would generally range from negligible beneficial effects to negligible to moderate adverse effects depending on the species. Impacts to these species during construction of the 11-acre wetland restoration/mitigation component would be non-existent to negligible adverse.

Species included in this category are federally or state-listed threatened and endangered species that are only occasional visitors or vagrants to the Project Area or were formerly listed as a Species of Concern by the Sacramento office of the USFWS. The discontinuation of agricultural management practices such as levee maintenance, ditching, and withdrawal of water for the purposes of irrigation would have negligible beneficial effects on species such as **California freshwater shrimp**, California brown pelican, green sturgeon, **southwestern river otter**, and **northwestern pond turtle**, because of the reduction in potential for impacts associated with these practices. Saltmarsh common yellowthroat would benefit at least negligibly from the reestablishment of riparian vegetation following removal of grazing pressure. The American peregrine falcon would also benefit negligibly under this alternative from an increase in the vole and mouse population with discontinuation of mowing and manure spreading and the reduction or elimination of grazing. Sandhill crane, which is a very rare visitor to wet pastures, would not be affected under the No Action Alternative.

Over the long-term, the slow decay or abrupt breaching of the levees anticipated under this alternative could change the nature of impacts for at least two of the species. With levee failure, grassland would be converted into tidal and brackish marsh. This shift could decrease the number of rodents in the Giacomini Ranch relative to baseline conditions and potentially have a negligible adverse effect on peregrine falcon numbers and use.

This change could have a moderate adverse impact on **northwestern pond turtle**. The increase in salinities, coupled with the loss of levees possibly used for aestivation, would have an appreciable effect on the use of the ranch by this species and would lead to a decrease in its numbers. In addition, the turtle may be adversely affected by reconnection of the East Pasture Old Slough Pond, although turtles have not been sighted in this area (Fellers and Guscio 2002): Mitigation measures for this portion of the proposed project are discussed in a separate sub-section below. The turtle may possibly move into Olema Marsh, which would actually have a small net increase in Freshwater Marsh habitat. It has not been documented currently in the marsh, although it occurs in nearby reaches of Lagunitas Creek, so it is possible that habitat conditions are not appropriate for this species (e.g., not enough basking or aestivation sites).

Possible Additional Mitigation Measures: Standard BMPs would be implemented to reduce impacts to special status species and wildlife habitats are discussed under Chapter 2. All construction and staging/stockpiling areas would be cleared by biologists prior to use to ensure that there are no nesting or breeding species within the vicinity of the Project Area or staging/stockpile areas prior to implementation. Measures specific to certain species are described below:

California red-legged frog: Construction activities would include removal of roads, fences, and ditches within the Project Area, and excavation of certain portions of the East Pasture Old Slough. Though not documented as supporting breeding habitat, the Old Slough and ditches may provide non-breeding habitat. Construction activities adjacent to or within California red-legged frog habitat documented as breeding habitat would not be conducted until August. Pre-construction surveys would be completed in all construction areas to confirm that no red-legged frogs are present. Frogs encountered would be relocated.

Tidewater goby: Construction would not occur in or directly adjacent to existing tidewater goby habitat during the typical season of reproduction for tidewater goby documented in the literature (late April – early summer; Swift 2003). Prior to construction in the East Pasture Old Slough Pond, extensive seining would be performed after some dewatering to lower water levels and to increase the efficiency of trapping. Minnow traps and dipnets may also be used to increase capture rates. Captured fish would be immediately relocated to Tomasini Creek.

California black rail and California clapper rail: The East Pasture is across Lagunitas Creek from established habitat for California black rail and California clapper rail, but is not currently identified as rail habitat. The project would comply with directives to not come within 250 feet of established rail habitat prior to August 31 by delaying construction in the northern portion of the East Pasture until September.

Northwestern pond turtle: Prior to construction in the ditches and East Pasture Old Slough, water levels would be lowered to the extent possible, and turtles would be trapped and relocated to appropriate habitat, either Lagunitas Creek or the Martinelli Ponds in the Martinelli Ranch directly to the north of the Giacomini Ranch.

Effectiveness of Proposed Additional Mitigation Measures

California red-legged frog: The mitigation measures should reduce any potential impacts to negligible levels.

Tidewater goby: The mitigation measures would be expected to reduce impacts, but impacts cannot be eliminated. Even with extensive seining, some mortality of fish would be expected, because tidewater goby burrow in the mud, making it extremely difficult to trap all fish. Construction would, therefore, result in incidental take. The proposed mitigation measure would result in this alternative having moderate adverse impacts on tidewater goby during construction.

California black rail and California clapper rail: The mitigation measures should reduce any potential impacts to negligible levels.

Northwestern pond turtle: The mitigation measures would be expected to reduce impacts, but would not eliminate them. Even with dewatering of the channels and extensive trapping, some mortality of turtles would

be expected. The proposed mitigation measure would result in this alternative having moderate adverse impacts on turtles during construction.

Cumulative Impacts: Generally, the No Action Alternative would not result in major or substantial cumulative impacts on common or special status species wildlife habitat or use in the Project Area with other proposed projects or plans in the region. Cumulative effects for most species, if any effects exist, would be characterized as beneficial negligible.

There are a number of projects in the Seashore and Marin County region that would have -- or have had -- effects on California red-legged frogs and red-legged frog breeding habitat. These projects include the Bear Valley Creek Watershed and Fishery Enhancement Project; Coastal Watershed Restoration – Drake's Estero Road Crossing; Coastal Watershed Restoration – Geomorphic Restoration Project; Horseshoe Pond Restoration Project; Wetland Restoration Project at Big Lagoon, and the County of Marin Culvert Cleaning project. The County of Marin is planning on cleaning out a ditch and culverts that convey flow from Silver Hills Creek to Lagunitas Creek along the perimeter of Olema Marsh, a documented red-legged frog breeding area, in either fall of 2007or 2008. The Bear Valley Creek and Drake's Estero Road Crossing project would cause temporary impacts to non-breeding habitat. The Drake's Estero project is scheduled to be constructed in 2007, and there is no definitive timeframe for construction of the Bear Valley Creek project. The Geomorphic Restoration Project, which would also be constructed in 2007 and 2008, would have moderate impacts on red-legged frog breeding habitat, but these impacts are being mitigated to negligible or minor levels through a suite of pond creation, maintenance, and repair actions in the Seashore. The Horseshoe Pond Restoration Project has already been constructed and had at least moderate impacts on red-legged frog populations in this area, although some of the impacts have been mitigated through implemented or planned construction or enhancement of ponds in the upper watershed. Impacts to red-legged frog from implementation of the Big Lagoon project would potentially be major, but this project would not affect the same portion of the Core Area. Based on this range of impacts, cumulative effects from implementation of the No Action Alternative in combination with these constructed or proposed projects would remain negligible to minor adverse, because most of the impacts are being mitigated to negligible or minor levels.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of the No Action Alternative on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from moderate adverse to minor beneficial (Table 75). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. Construction of the No Action Alternative would have only very negligible adverse effects, if any, on High Value Wildlife Habitats and use by common wildlife species, however, there could be minor to moderate adverse impacts on special status species such as tidewater goby.

Over the long-term, the No Action would be expected to would have minor beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some very negligible adverse impacts during construction of the 11-acre wetland restoration/mitigation component. As there would be no change in public access facilities under the No Action Alternative, no detectable change would be expected in terms of visitation and, consequently, in the potential effects on visitors on wildlife use, success of breeding efforts, and other behaviorial variables relative to baseline conditions.

Under this alternative, the Giacomini Ranch would largely remain grassland, although it would change in nature due to the elimination of grazing or reduced grazing intensity and the elimination of intensive agricultural management practices. The acreage of wetland and riparian habitats would increase in the Giacomini Ranch, because of the 11-acre wetland restoration component, the reduced grazing pressure on riparian habitat, and the expansion of Freshwater Marsh habitats with the elimination of frequent ditching to drain pastures. These factors would potentially cause a minor increase of approximately 6 percent in High Value Wildlife Habitats. Over time, with slow decay or abrupt breaching of levees, grasslands would begin converting to brackish and tidal marsh habitats, thereby attracting a different assemblage of wildlife species. These brackish and tidal marsh habitats would possibly continue to evolve in the future in response to sea level rise, which may be increasing at a much greater rate than was originally predicted (Overpeck et al. 2006).

The small increase in High Value Wildlife Habitats would have a negligible beneficial effect over the long-term on use of the Project Area, with use by common and special status wildlife species potentially increasing by as much as 3 percent. The largest changes in wildlife use under this alternative would be expected to come from increased use of expanded Forested and Scrub Shrub Riparian habitat by resident and Neotropical migrant passerines or riparian bird species. In general, amphibians and reptiles would be the most adversely affected by the No Action Alternative. The No Action Alternative would have a negligible adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions. Only a negligible beneficial would be expected in terms of support of wildlife species in southern portion of the Tomales Bay watershed, with most of the benefits coming from discontinuation of agricultural management practices in the Project Area that affect conditions in Lagunitas and, ultimately, the bay.

California red-legged frog: The No Action Alternative would have a negligible adverse effect on California red-legged frog breeding habitat units and distribution of the species in the Point Reyes Peninsula Core Area, but a minor adverse effect on distribution of red-legged frogs in the Project Area. Over the long-term, impacts could possibly increase to minor, because degradation of the levees and sea level rise could cause a measurable effect on breeding habitat units and regional distribution. Impacts during construction of the wetland mitigation/restoration component in the northern portion of the East Pasture where no breeding has been documented would be expected to be non-existent or very negligible. There is a potential for cumulative impacts with other projects proposed in the Seashore or Marin County region, but, based on evaluation of impacts and proposed mitigation measures for those projects, impacts under this alternative would still be characterized as negligible to minor adverse.

Tidewater goby: The No Action Alternative would have very negligible beneficial effects on tidewater goby in the Project Area through a potential increase in quality of existing habitat, although, over the long term, slow decay or sudden breaching of levees could increase the benefits to tidewater goby by increasing the amount of available habitat. Impacts during construction would be expected minor to moderate at most, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Salmonids: The No Action Alternative would have a very negligible beneficial effect on salmonid rearing and passage habitat in the Project Area. No impacts to at the very most very negligible effects on salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration/mitigation component

California black rail/California clapper rail: The No Action Alternative would have a negligible beneficial effect on California black rail by causing a barely detectable increase in appropriate breeding, foraging, and refugia habitat with restoration of 11.4 acres of mid- and high Tidal Salt Marsh. Impacts during construction would either be non-existent or very negligible, at most.

Other Special Status Species: The effects of the No Action Alternative would generally range from negligible beneficial effects to negligible to moderate adverse effects depending on the species. Impacts to these species during construction of the 11-acre wetland restoration/mitigation component would be non-existent to negligible adverse.

Alternative A

Analysis: The effects of Alternative A on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from moderate adverse to major beneficial. Under Alternative A, the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh, except for the potential future extension of the southern perimeter trail to Inverness Park. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained, but not maintained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile and actively revegetated with riparian vegetation. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

Wildlife Habitats and General Wildlife Use – Project Implementation: Over the long-term, the Alternative A would be expected to have moderate beneficial effects on High Value Wildlife Habitats in the Project Area,

although there may be some minor adverse impacts during construction in the East Pasture. The largest single change under this alternative relative to the No Action Alternative would come from the substantial conversion of grassland to salt and brackish marsh through breaching of the East Pasture levee, removal of agricultural infrastructure, and tidal reconnection and expansion of the historic tidal slough. Through these actions, more than two-thirds of the East Pasture would be expected to shift from grassland to marsh. A transitional period would be expected over the short-term during which, as pasturelands slowly convert through exposure to saline conditions to marsh, restored areas would be dominated by a mix of non-native opportunistic, moderately salt-tolerant species characteristic of brackish conditions such as brass buttons, annual beard-grass, loosestrife, birdfoot trefoil, curly dock, and others. During this period, impacts to High Value Wildlife habitats would be negligible adverse, because much of the habitat being disturbed consists of highly managed pasturelands: while these type of habitats provide value, they are of lower value than many other unmanaged or less managed habitats.

The moderate increase in High Value Wildlife Habitats would have a minor beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species measurably increasing. Some of the largest changes in wildlife use under this alternative would be expected to come from increased use of expanded marsh and riparian habitats by waterbirds such as California black rail, marsh passerines, and resident and Neotropical migrant passerines or riparian bird species. Abundance and areal extent of fish and invertebrate species would increase, as well. As with the No Action Alternative, however, amphibians and reptiles would be the taxa most adversely affected by implementation of this alternative.

Under Alternative A, Tidal Salt Marsh, a High Value Wildlife Habitat, would increase more than 350 percent relative to both baseline conditions and the No Action Alternative. Tidal Brackish Marsh could increase almost 50 percent through expansion of tidal reconnection of the East Pasture and the East Pasture Old Slough and limited creation of new tidal channels. The conversion of agricultural lands to Tidal Salt Marsh would decrease abundance of some species, but increase abundance of others. Grassland-associated species such as western meadowlarks, savannah sparrows, and grasshopper sparrows would dwindle in numbers, as would voles and other ground-based mammals that are prey for raptor species. Use by certain waterfowl and shorebirds that utilize open, ponded pasture such as yellowlegs and green-winged teal would also decrease, although preservation of the shallowly flooded and sparsely vegetated flats in the northeastern corner of the East Pasture would continue to provide alternate high tide habitats for waterfowl and shorebirds during the winter as it does now.

However, the conversion to marsh would benefit six special-status bird species: California black rail, great egret, saltmarsh common yellowthroat, short-eared owl, and peregrine falcon, by expanding foraging, nesting and/or rearing, and refuge habitat. These habitats would also benefit generalist waterbirds such as great egret and generalist shorebirds such as willet, godwit, and greater yellowlegs. Salt marsh also provides foraging habitat for raptors species - such as short-eared owl, white-tailed kite, northern harrier, and peregrine falcon - drawn to the site by small vertebrates such as California voles, shrews, and garter snakes. Other species also use marshes for foraging, including small mammals, passerine birds, and shorebirds. The Muted Tidal Brackish Marsh - Mudflat/Panne in the southeastern portion of the East Pasture would continue to attract moderately high numbers of shorebirds and waterfowl during the winter and provide alternate habitat for these species during high tide conditions within Tomales Bay.

In addition to substantially expanding the areal extent of tidal salt marsh habitat, Alternative A would improve the quality of existing salt marsh habitat through cessation of agricultural practices: removal of irrigation infrastructure and elimination of active grazing would lead to an increase in structural complexity and the percentage of native plant species in the salt marsh community, which would result in a greater diversity of habitat patches and an increase in high-quality edge habitat. The value of the newly created Tidal Salt Marsh and Tidal Brackish Marsh habitats to wildlife would be promoted by the presence of a large tract of undiked tidal salt and brackish marsh habitats immediately adjacent to the East Pasture in the undiked marsh. While not physically contiguous, this proximity between areas encourages a synergistic effect in which wildlife numbers would be higher together than they would have been separately, because of the affinity of many species for unfragmented, larger habitats.

Under Alternative A, Tidal Salt Marsh–High/Upland Ecotone habitat would almost triple, with this higher elevation habitat establishing in the southern portion of the East Pasture where tidal influence is restricted to higher high and extreme storm tides. This habitat provides refuge for salt marsh species such as California clapper rail, California black rail during high tides and winter flood events. The salt marsh upland ecotone habitat also provides resting and cover habitat for those species that travel frequently between open water,

marsh, riparian forest, and grassland habitats, including the saltmarsh common yellowthroat, song sparrow, savannah sparrow, wrentit, and other passerine birds.

Grazing removal would favor natural expansion of riparian habitat along Fish Hatchery Creek and the western perimeter where groundwater flow creates optimal conditions for riparian vegetation. Riparian habitat, on the other hand, would continue to potentially decrease in Olema Marsh in response to what appears to be increasing water levels caused by poor drainage from undersized culverts and other factors. Open water and Freshwater Marsh communities would increase as a result. Overall, Forested and Scrub Shrub Riparian Habitat could increase more than 10 percent from removal of grazing and agricultural management, although some riparian habitat would be eliminated to create the through-trail component for the eastern perimeter trail and possibly also the potential future extension of the southern perimeter trail to Inverness Park.

The eastern perimeter trail would result in a permanent loss of 0.54 acres of riparian habitat and another 0.34 acres of temporary loss from trimming or limb removal. Trimmed vegetation would regrow relatively quickly, but, even with rapid regrowth, the trail would still represent a disturbance factor and would fragment the already narrow Tomasini Creek east bank riparian corridor. This fragmentation could affect the relative abundance and success of breeding for species observed to breed in this riparian thicket, including saltmarsh common yellowthroat and Swainson's thrush (J. Evens, ARA, pers. comm.). Construction of the southern perimeter trail and the possible extension of that trail to Inverness Park could also affect common yellowthroat, which is known to breed in the general vicinity of both of those areas. Construction of the southern perimeter trail would involve only limited removal of vegetation for the bridge, but one of the two possible options for extending the southern perimeter trail to Inverness Park includes widening of the Sir Francis Drake Boulevard road berm through placement of fill in wetlands and removal of a considerable amount of riparian revegetation. The other option would involve a boardwalk through the West Pasture and would have much less direct impacts to wildlife habitat. Riparian habitat provides structural refuge critical to passerine birds, including saltmarsh common yellowthroat; mammals, such as southwestern river otter, dusky-footed woodrat, and black-tailed deer; and amphibians, including California red-legged, and Pacific tree frog. Many vertebrate species utilize tidal salt marsh and freshwater marsh habitats for foraging, but also require nearby high-quality riparian forest or scrub shrub habitat for resting and refuge.

Under Alternative A, the extent of subtidal and intertidal channels in the Project Area would increase more than 10 percent relative to existing conditions. This change would result from removal of the levees between Lagunitas Creek and the East Pasture and reconnection and expansion of the historic slough (East Pasture Old Slough). Breaching of the levees would allow for saline and brackish waters to inundate existing channels and the existing Old Duck Pond. The increase in sub- and intertidal waters in the East Pasture would benefit species such as the southwestern river otter, waterfowl and waterbirds, fish-eating raptors, and estuarine fish and invertebrates. This increase in tidally driven subtidal and intertidal habitats would account for the corresponding loss in non-tidal freshwater pond and channel habitat due to the expansion of tidal influence into the historic slough channels and the Old Duck Pond in the East Pasture. Expansion of these lower energy subtidal and intertidal habitats could provide new habitat for numerous estuarine and brackish aquatic species, including tidewater and arrow goby. Tidal channel creation would be limited in the northeastern corner of the East Pasture to preserve the shallow shorebird area where prolonged ponding has created sparsely vegetated flats that attract waterfowl and shorebirds during the winter, particularly when tides are high in Lagunitas Creek and the adjacent undiked marshlands.

As discussed under the No Action Alternative, the current conversion of approximately half of the West Pasture freshwater marsh from Freshwater Marsh to Muted Tidal Brackish Marsh would continue. Since repair of the failed tidegates in 2003, tidal waters have flowed into the marsh during the higher high tides in winter and have remained ponded there for several months due to poor drainage conditions. This saltwater intrusion has increased maximum and average salinities within the marsh and started to convert at least the lower-elevation northern portions of the Freshwater Marsh habitat to Muted Tidal Brackish Marsh. This conversion may have already caused impacts to the California red-legged frog population, as abundance has not rebounded since the initial baseline study documented relatively high numbers in 2001 (G. Fellers, USGS, unpub. data). Numbers of these frogs would be expected to continue to remain low under Alternative A.

In addition to the red-legged frog, another special status species, the Northwestern pond turtle, would be adversely affected by these changes, with barely detectable to measurable changes in habitat and numbers expected. These same factors would also, however, have a beneficial effect on the amphibian and reptile community by decreasing the extent of appropriate habitat for a non-native predator of the red-legged frog, the bullfrog, which occurs in the East Pasture, Tomasini Creek, and the West Pasture. Some of the adverse

impacts to native amphibian and reptile species from loss of a portion of this marsh may be countered to some degree by increases in Freshwater Marsh habitat on the perimeter of the Giacomini Ranch where groundwater influence is strong because of the lack of draining and ditching activities. This issue is discussed further under the Special Status Species portion of this section. While negatively affecting frogs, the conversion of this habitat would benefit passerine bird species, such as salt marsh common yellowthroat and red-winged blackbird, which use tall vegetation for nesting and resting habitat while maintaining close proximity to more open foraging habitat.

As discussed under the No Action Alternative, increasing water levels in Olema Marsh and the associated decline in riparian habitat would result in a decline in riparian-associated avian species (e.g. warbling vireo, Swainson's thrush, and Wilson's warbler) at the marsh, although there may be an increase in species (e.g. swallows) that nest in cavities in snags and forage over the expanding Freshwater Marsh. The increasing water levels and predicted subsequent expansion of Freshwater Marsh would continue to support marsh wrens, song sparrows, salt marsh common yellowthroat, and Virginia rails, as well as migratory waterfowl. The expansion of freshwater marsh may increase breeding potential for waterfowl species such as mallard, gadwall, and Canada goose in Olema Marsh. In addition, it could increase habitat for California red-legged frog and bullfrog, both of which currently occur in the marsh.

Wildlife Habitats and General Wildlife Use – Long-Term Changes: The brackish and tidal marsh habitats described above would eventually develop after a short-term (~ 10 years) transitional period in which grassland is converted into marsh. These habitats would possibly continue to evolve in the future in response to sea level rise, which may be increasing at a much greater rate than was originally predicted (Overpeck et al. 2006). The projected rate of 3 feet of sea level rise by 2100 could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions to intertidal emergent wetland habitats. This shift would attract specific avian species such as diving ducks, dabbling ducks, marsh-associated passerines, and other aquatic species.

Over the long-term, the increase in public access facilities relative to existing conditions could increase disturbance of wildlife through causing wildlife to avoid highly trafficked areas, flushing wildlife repeatedly, and decreasing reproductive success through damage to eggs from trampling or nest abandonment. While results of some studies are equivocal on the effects of public access on wildlife (Sokale and Truljio 2000), most studies point to public access as not only causing immediate adverse responses such as flushing or death, but more indirect or long-term responses such as altered behavior, reduced health and productivity, and changes in abundance or species composition (BCDC 2001). Construction of the southern perimeter trail would greatly increase wildlife viewing opportunities on this reach of Lagunitas Creek and could increase adverse effects on wildlife, depending on visitation numbers. However, this area already receives a considerable amount of disturbance from users of the existing informal path, Giacomini Ranch maintenance, users of the Green Bridge and White House Pool County parks, and residents along Levee Road. In this context, impacts relative to existing conditions would be expected to be only negligible adverse.

Conversely, the eastern perimeter trail area is currently not used as a trail nor regularly maintained, and adjacent homes are some distance above on the Point Reyes Mesa bluff. The eastern perimeter trail would not only directly affect riparian habitat through permanent and temporary construction-related loss, but would lessen the quality of the remaining riparian habitat for breeding birds and other wildlife species. It is possible that this trail would also cause decreases in use of the shallow shorebird area in the eastern portion of the East Pasture, which is frequented by shorebirds and ducks in mid-winter to early spring. However, the shallow shorebird area would be separated from the trail by Tomasini Creek and its berm, so only a considerable amount of noise and activity from visitors would probably have an effect. Relative to existing conditions, this trail would be expected to have minor and at the most moderate adverse impacts on wildlife use.

In addition, under Alternative A, the informal path on the Giacomini Ranch north levee would remain. While usually used only infrequently, this trail attracts large numbers of birdwatchers during the winter and spring high tide events to see California black rails, which are less secretive and easier to spot during these conditions. The levee on which the trail has developed is used by these relatively poor fliers during high water events, because of the lack of other suitable upland habitat adjacent to the marsh. Use of the levee during these periods flushes rails from their refugia and may increase their risk of predation. An increase in marsh habitat and elimination of the dairy could encourage more birdwatchers to use this trail and, thereby, increase impacts to this special status species.

Wildlife Habitats and General Wildlife Use – Construction: Construction of Alternative A would generally have only negligible adverse effects on High Value Wildlife Habitats and use by common wildlife species. Special status species are discussed individually.

Three of the proposed construction activities would have the highest potential to affect both common and special status wildlife species. These activities are regrading of the southwestern levee in the East Pasture and creek bank to a more stable profile, filling of drainage ditches, and tidal reconnection of the East Pasture Old Slough Pond. Grading of the southwestern levee in the East Pasture has the potential to negatively affect aquatic organisms in the White House Pool reach such as California freshwater shrimp through incidental sediment discharge during earthmoving and removal of willows that provide overhanging shade and habitat complexity in surface waters. Similar impacts could occur in areas where the levee is breached.

During removal of agricultural infrastructure, a portion of the drainage ditch system would be plugged with a dense clay material, filled to surrounding elevation grades, and finely graded. This 0.27 acres of ditch system supports a relatively depauperate aquatic community, comprised only of a few hardy invertebrates, mosquitofish, threespine stickleback, arrow goby, and crayfish. However, in 2006, tidewater goby were discovered in the East Pasture Old Slough Pond, the northernmost remnant of a historic slough system that has been leveed, dredged, and, in many areas, straightened to be part of the ditch system. Because this area is not tidally connected or connected to existing muted tidal habitats, this fish must have established either during the period when the East Pasture was completely flooded in December 2005-January 2006 or through access of the pond via a leaking set of tidegates. The ditches also support northwestern pond turtle and very low numbers of adult red-legged frog. The pond, adjacent portions of the ditch system, and a shoal on the outboard side of the levee would be shallowly excavated to improve hydraulic connection of the East Pasture Old Slough with Tomales Bay. Some tall emergent vegetation within the ditch would be removed. These actions have the potential to impact wildlife either through direct mortality or through disruption of the breeding cycle. Non-resident species such as waterfowl, waterbirds, and southwestern river otter would not be impacted unless nesting or breeding was occurring: as noted earlier, pre-construction surveys would be conducted prior to initiating construction to ensure that construction activities do not disrupt breeding, nesting, or fledging/rearing.

Based on the scale and timing of construction activities that could affect High Value Wildlife Habitats and use by common wildlife species, the impacts of construction are characterized as negligible adverse. The intensity of construction impacts on special status species is addressed separately below. Mitigation measures are discussed in a separate sub-section below.

Invasive Wildlife Species: Alternative A would have a minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions. Under this alternative, most of the invasive species already present in the Project Area would be expected to remain, with a possible establishment into or expansion of numbers or extent within the fully tidal East Pasture and the muted tidal West Pasture by some of the aquatic invasive species such as European green crab, Korean shrimp, and possibly the New Zealand burrowing isopod and yellowfin goby. These species represent animals already present within the Project Area and Tomales Bay watershed.

There is a potential for future invasion as well by animals that are not yet found in the watershed, but that are likely to invade this estuary in the future because of their rapid spread within other regional estuaries such as San Francisco Bay. Some of the most highly invasive taxa within estuarine habitats are fish and invertebrates. Recent studies on restored and natural marshes of varying age in the Sacramento Delta and northern San Francisco Bay have found that the invertebrate community is dominated by non-native polychaetes, crustaceans, and bivalves, some of which are having profound effects on the Bay-Delta ecosystem (Simenstad and Bollens 2002). Among these species are Asian clam (*Potamocorbula amurensis*), which is a highly invasive species currently found in very high densities in northern San Francisco Bay sediments, and Chinese mitten crab (*Eriocheir sinensis*), which was introduced into San Pablo Bay sometime before 1994 and has subsequently spread throughout the South Bay and Bay-Delta areas. The Asian clam and some of its counterparts have been strongly linked with large-scale reductions in phytoplankton biomass that have changed over the past few decades the food chain dynamics of the Bay-Delta ecosystem.

As with the No Action Alternative, Alternative A would have some effect on freshwater and terrestrial invasive species, as well. Under both the No Action Alternative and Alternative A, the northern half of the freshwater marsh in the West Pasture would continue to convert to Muted Tidal Brackish Marsh habitat. In addition to California red-legged frog and Pacific tree frog, this marsh also supports an unknown number of bullfrogs,

which were sighted for the first time in 2006 (P. Kleeman, *USGS, pers. comm*.). Other invasive freshwater aquatic species include mosquitofish and crayfish, both of which are currently found within the Project Area. Reintroduction of tidal action to the East Pasture, combined with filling of a portion of the drainage ditches, would decrease numbers and areal extent of these species, although mosquitofish have also occur in more saline waters in undiked areas (NPS, unpub. data), suggesting that this species can tolerate brackish conditions.

Over the long-term, then, numbers and areal extent of these species would contract in response to increased tidal inundation, but they would be likely to persist in creeks and fringe habitats along the ranch perimeter where conditions are more appropriate. While changes in some portions of the Giacomini Ranch might be detrimental to freshwater species, the current trend in Olema Marsh of conversion of riparian habitat to Freshwater Marsh and permanently flooded Open Water would be expected to continue, thereby maintaining or even increasing numbers of bullfrogs. Mosquitofish and crayfish have not been observed in this system, but the marsh is difficult to survey, so it is possible that at least mosquitofish occur there.

The large-scale conversion of grassland to marsh habitats would reduce at least the areal extent of potential habitat for red fox and wild turkey and possibly for feral cats and dogs, as well. These species, however, are somewhat opportunistic and would be expected to persist along the edges of the Giacomini Ranch where conditions are appropriate. These species would continue to access East and West Pasture grassland areas for foraging, resting, and other purposes. Red fox and feral cats, as well as Norway rats, have been implicated strongly in the decline of rail populations in San Francisco Bay. Monitoring throughout the Seashore for impacts of feral cats and dogs is ongoing (N. Gates, wildlife biologist, Seashore, *pers. comm*.). Should impacts on special status species or other species of concern in the Project Area be detected, removal of feral animals will be implemented as mandated by Park Service Management Policies (NPS 2006, Section 4.4.2.1).

Wildlife Conditions in the Watershed: Tidal reconnection of the 350-acre East Pasture to Lagunitas Creek would have a minor beneficial effect in terms of support of wildlife species in southern portion of the Tomales Bay watershed. Tidal reconnection would increase considerably the potential for export of sources of carbon such as dissolved and particulate organic carbon, phytoplankton, seeds and other plant matter, and aquatic organisms to the bay. In addition, marine and estuarine species that wander into the southern portion of the bay in search of food would be able to access the East Pasture through the newly reconnected East Pasture Old Slough. This tidal channel network would provide not only access to food sources, but refugia. In addition, as with the No Action Alternative, discontinuation of agricultural management practices in the Project Area would also affect conditions in Lagunitas and, ultimately, the bay. Watershed habitat quality would be improved by discontinuation of levee maintenance, withdrawal of water for irrigation, infrequent pumping of waters from the ranch into Lagunitas Creek, and crossing of Lagunitas Creek by cattle.

California red-legged frog: Similar to the No Action Alternative, Alternative A would have a negligible adverse effect on California red-legged frog breeding habitat units and distribution of the species in the Point Reyes Peninsula Core Area, but a minor adverse effect on distribution of red-legged frogs in the Project Area. Over the long-term, impacts could possibly increase to minor, because degradation of the levees in the West Pasture and sea level rise could cause a measurable effect on breeding habitat units and regional distribution. Impacts during construction of the wetland mitigation/restoration component in the northern portion of the East Pasture where no breeding has been documented would be expected to be non-existent or very negligible.

Baseline studies documented two general areas that provide breeding habitat for red-legged frog. The largest of these is the West Pasture freshwater marsh. Breeding also has sporadically occurred in adjacent Fish Hatchery Creek, creating another 1.0 acre of breeding habitat in the West Pasture. The second breeding habitat is in the Olema Marsh and is assumed to comprise all of the areas with Freshwater Marsh and Open Water, which total 39 acres. There is no documented breeding habitat in the East Pasture, although a few adult frogs were observed during baseline surveys (Fellers and Guscio 2002).

As discussed under the No Action Alternative, the pattern of saltwater intrusion converting the northern half of the West Pasture freshwater marsh to brackish marsh would continue. The southern half would still not be affected by salinity intrusion, perhaps because of slightly higher elevations, which reduce the reach of tides, and high perennial freshwater inflow from the 1906 Drainage and Inverness Ridge groundwater. The Park Service is conducting a habitat enhancement project in 2006 that would slightly expand higher elevation Freshwater Marsh habitat by approximately 0.4 acres. In addition, continued increases in water levels in Olema Marsh due to poor drainage would continue to convert Forested and Scrub Shrub Riparian habitat to Freshwater Marsh and Open Water habitat, perhaps providing a very negligible increase in breeding habitat for

red-legged frog. Because breeding frogs are currently located in the West Pasture, across Lagunitas Creek from the East Pasture, the large-scale conversion of grassland to marsh in the East Pasture is characterized as a minor adverse impact to non-breeding habitat.

While the West Pasture levees and infrastructure would remain under Alternative A, discontinuation of levee maintenance would result in slow decay of levee and tidegate facilities. The slow decay or sudden breach during large storm events of these facilities would allow for greater tidal flooding and thereby further reduce viable red-legged frog breeding habitat in the West Pasture. Under full tidal conditions, an additional 1.5 acres of breeding habitat would be lost through conversion to brackish or saline habitats. This impact could be increased over the long-term by sea level rise, which may be rising at a much higher rate than originally predicted. If the levees decayed or abruptly breached, impacts on red-legged frog in the Project Area and Point Reyes Peninsula Core Area would be characterized as minor, with the exact effect dependent on a number of factors, including annual variability in rainfall and runoff conditions and possible passive creation of Freshwater Marsh in other areas through discontinuation of agricultural management.

Impacts on red-legged frog during construction of the East Pasture restoration component would be expected to be negligible. There is no breeding habitat in the East Pasture, and only a few adult frogs have been occasionally been sighted in the East Pasture. Construction activities expected to have the most effect would be filling in of the drainage ditches, tidal reconnection of the East Pasture Old Slough and excavation, and construction of the eastern perimeter trail in the riparian habitat adjacent to Tomasini Creek. Possible mitigation measures are discussed in a separate sub-section below.

Tidewater goby: Alternative A would have minor to eventually moderate beneficial effects on tidewater goby in the Project Area after implementation through a potential increase in the areal extent of East Pasture habitat and quality of other existing habitats in Tomasini Creek and the West Pasture. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Within the Project Area, Acreage of existing tidewater goby habitat in the Giacomini Ranch totals 11.3 acres. This species occurs primarily in three areas within the Giacomini Ranch: Tomasini Creek, the West Pasture Old Slough and possibly Fish Hatchery Creek, and the non-tidal East Pasture Old Slough Pond. A detailed description of these areas can be found under the No Action Alternative. Numbers of tidewater goby in the Project Area have also been relatively low within each of these sites, ranging from five to 22 at most. These sites represent the only known occurrence of this species in the Tomales Bay watershed, as, prior to 2002, the species had last been sighted in the bay in 1953. Genetic analyses indicate that this population is genetically distinct from the nearest existing occurrences of tidewater goby at Salmon Creek Marsh and Rodeo Lagoon (Jacobs and Earl 2005).

Similar to the No Action Alternative, construction of the East Pasture restoration component includes the captive propagation program described in Chapter 2 and tidal reconnection of the East Pasture Old Slough Pond with Lagunitas Creek and Tomales Bay. Under this alternative, the pond, the diked portion of slough adjacent to the pond, and a shoal on the outboard side of the levee would also be shallowly excavated to improve hydraulic connectivity of the reconnected slough with Lagunitas Creek. While approximately 0.3 acres of ditches would be filled in as part of the elimination of agricultural infrastructure under Alternative, A, there would be approximately 1.0 acre of new tidal channel creation. Possible mitigation measures are discussed in a separate sub-section below.

Following project implementation, Alternative A would result in minor to eventually moderate beneficial effects on tidewater goby by increasing areal extent of habitat within the East Pasture through tidal reconnection of the East Pasture Old Slough and creation of new tidal channels. These effects would remain relatively minor over the short-term until marsh conditions become better established within the East Pasture. During this transitional phase, existing habitat conditions would be maintained in the West Pasture Old Slough and Tomasini Creek through retention of the tidegates and associated hydrologic infrastructure: tidal influence in the West Pasture Old Slough is controlled via a tidegate on Fish Hatchery Creek. While tidegates are intended to either eliminate or minimize tidal influence, tidegates on Tomasini Creek and Fish Hatchery Creek allow either a moderately reduced (Fish Hatchery) or the full range (Tomasini Creek) of high tides. In the case of Tomasini Creek, and possibly Fish Hatchery Creek, the tidegates appear to have more of an effect on tidewater goby by preventing complete drainage during low tides. This maintains permanent ponding or subtidal conditions within the creek, which may have become intertidal mudflat during low tides if it had been allowed to drain completely. The tidegate, along with natural gravel bar features create residual brackish pool

habitat that provides habitat for the tidewater goby, despite the fact that the substrate and flow conditions are probably not optimal.

The only potential impacts to existing habitat in Tomasini Creek under this alternative would occur in conjunction with construction of the eastern perimeter trail and use. This trail would be constructed along the former railroad grade directly adjacent to Tomasini Creek and the primary tidewater goby habitat in the Project Area. Existing dense willow and blackberry (riparian) thickets that would be permanently or temporarily lost during construction provide cover for the creek. Perennial seeps on the Point Reyes Mesa appear to contribute substantially to maintenance of brackish conditions in the creek, which is subject to the full range of high tides. A brackish water species, tidewater goby is sensitive to higher salinity waters approaching marine salinities (~34 ppt), preferring salinities in the 12 ppt, although a wide range of salinities can be tolerated from 0.5 ppt up to at least 25 ppt (Swift 2003). As part of this trail component, a culverted berm would be used to construct the trail, which may adversely affect at least the surface-flow contribution of seeps from the mesa to Tomasini Creek.

In addition to creating new habitat and maintaining existing conditions in old habitat, tidal reconnection and discontinuation of agricultural management would also improve water quality within the East Pasture Old Slough, Tomasini Creek, and the Wet Pasture Old Slough. Based on observations of dead marine fish during the 2006 sampling, the East Pasture Old Slough Pond probably has at least short periods of sub-optimal water quality. A reduction or removal of grazing, manure spreading, levee maintenance, and ditch dredging would increase water quality within waters of these habitats, improving the quality of existing habitat for tidewater goby.

Over the long-term, the effects of Alternative A on tidewater goby habitat would increase slightly relative to short-term conditions, because of a maturation of tidal and brackish habitats following a transitional phase of development. In addition, slow decay or abrupt breaching of the Giacomini Ranch West Pasture levees -- which would be retained, but not maintained -- would have the potential to increase habitat for tidewater goby through creation of more tidal channels and side channels in the West Pasture. The trend of conversion of grassland to brackish and tidal marsh habitats would be intensified by sea level rise, which may be increasing at a much higher rate than originally predicted. The projected rate of 3 feet of sea level rise by 2100 (Overpeck et al. 2006) could lead to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88, converting lower elevation portions of the pasture to subtidal and intertidal unvegetated habitats and higher elevations portions that would have developed into high marsh or remained grassland.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: The effects of Alternative A on salmonid rearing and passage habitat in the Project Area would be minor beneficial. Negligible adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration/mitigation component.

As discussed under the No Action Alternative, the Project Area does not represent a potential breeding or spawning area for steelhead, coho or Chinook salmon, but rather important feeding, resting, and refugia habitat for salmonids as they migrate to the ocean or move upstream to spawning grounds. The importance of estuarine habitats varies between salmonid species: Chinook typically spend the most time in wetlands before outmigrating to the ocean (Simenstad et al. 1982, Aitkin 1998), although estuaries are important for some coho populations, as well (Magnusson and Hilborn 2003; Miller and Sadro 2003).

Steelhead has recently been found in Fish Hatchery Creek, Tomasini Creek, the section of Lagunitas Creek in the Project Area, and in Bear Valley Creek upstream of Olema Marsh. Coho occur in Lagunitas Creek and in Tomasini Creek. Chinook has been documented in upstream portions of Lagunitas Creek, but they have not been captured as yet in the Project Area. Salmonid presence in these watersheds indicates that, while impediments, the levees and tidegate facilities are still allowing some degree of fish passage. The levees severely constrain the potential for development of off-channel or rearing habitat on Tomasini Creek and Lagunitas Creek. Fish Hatchery Creek is not leveed within the West Pasture, although it is infrequently dredged. On Bear Valley Creek, Levee Road, Bear Valley Roads, and their culverts limit both passage and rearing potential, along with the indistinct flow path in Olema Marsh created by excessive impoundment of waters.

The largest benefit to salmonids under this alternative would come from the minor increase in potential rearing habitat from tidal reconnection of the East Pasture Old Slough Pond with Lagunitas Creek. Aquatic edge habitat would increase approximately 13 percent relative to existing conditions, with edge habitat in the Project Area climbing from approximately 15 miles under existing conditions to 17 miles under Alternative A.

While approximately 0.3 acres of ditches would be eliminated, another 1.0 acre of new tidal channels would be created. In addition, as with the No Action Alternative, discontinuation of agricultural management practices would measurably improve passage and rearing conditions for salmonids not only in the East Pasture, but in Lagunitas Creek. These management practices include levee maintenance, dredging, cattle crossing of Lagunitas Creek, pumping of creek water for irrigation, and other factors. There would be no change in Olema Marsh, other than water levels would be expected to continue their rise, which may further affect the ability of salmonids to reach upstream portions of the watershed.

Over the long-term, slow decay or abrupt breaching of the Giacomini Ranch West Pasture levee would have the potential to increase habitat for salmonids through creation of more tidal channels and side channels in the West Pasture. While these channels could provide more refugia and foraging habitat for salmonids, levee failure could also create an ecological sink such that water could flood in, but not flow out, causing extensive stranding of aquatic species. The potential for this scenario is greater in the West Pasture than the East Pasture. This trend toward tidal reconnection with levee failure would be intensified by sea level rise, which may be increasing at a much higher rate than originally predicted.

Construction would have only the potential for negligible adverse impacts associated with grading of the southwestern portion of the Giacomini Ranch levee on Lagunitas Creek and possible removal of riparian vegetation, although every effort would be made to retain as much of the established vegetation as possible. Construction would be scheduled to ensure that grading does not begin before July 15, which is the end of the typical period for smolt outmigration.

California black rail and California clapper rail: Over the long-term, Alternative A would have a major beneficial effect on California black rail and California clapper rail by substantially increasing appropriate breeding, foraging, and refugia habitat with restoration of more than 250 acres of low-, mid- and high Tidal Salt Marsh adjacent to existing rail habitat. During the transitional period following construction, however, only negligible to minor beneficial effects would be expected, as grassland begins the process of converting to brackish and tidal marsh, leading to temporary establishment of a more weedy, ruderal habitat that would have less benefits for rails. Impacts during construction to existing rail habitat in the undiked marsh across Lagunitas Creek from the undiked marsh would either be non-existent or negligible, at most.

As discussed under the No Action Alternative, breeding populations of California black rail have primarily occur in the undiked marsh north of the Giacomini Ranch and in Olema and Bear Valley marshes in intermittent years (ARA 2002). Small numbers (1-2 individuals) also occurred within the Project Area in brackish and freshwater marsh, with possible breeding one year in the West Pasture freshwater marsh (ARA 2002). Clapper rail historically occurred in Tomales Bay, and individuals were sighted in the undiked marsh north of the Giacomini Ranch during fall and winter between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). There have been no sightings since then, however, and there are no recent breeding records either from the bay.

Under Alternative A, habitat for the black rail in the Project Area and adjacent undiked marsh to the north of the Giacomini Ranch would almost triple from approximately 120 acres to more than 250 acres with restoration of the East Pasture. The restoration would provide benefits primarily to black rail, although clapper rail could benefit substantially, as well, from establishment of low and high Tidal Salt Marsh habitats. While rails do not currently use the East Pasture, the proximity of the restoration area to the undiked marsh makes it more likely that rails would expand into the East Pasture and use the newly created habitat. Almost 80 percent of the habitat created (> 200 acres) would be mid-marsh habitat, which is suitable for breeding, nesting, and foraging by black rails. The remainder would be high marsh/upland ecotone habitat, which would serve as refugia for rails during high tide and storm tide conditions. Most of the high marsh/upland ecotone habitat would occur on the nearby Tomasini Creek levee, the newly created high tide refugia in the northeastern portion of the West Pasture, and the higher intertidal elevations areas in the southern portion of the East Pasture. Increases in high marsh habitat in Giacomini Ranch could, at least temporarily, offset any decreases in this habitat in the undiked marsh habitat north of the ranch from accelerated rates of bank slumping and channel widening that might be potentially being caused by a non-native isopod. This isopod would be likely to move south into the Giacomini Ranch once tidal connection and habitats are restored.

In other areas, decreases in rail numbers might be expected from continuation of existing conditions. Under this alternative, the West Pasture north levee would not be removed. Rails often use these levees during storms and extreme high tide events. While the levees are well above most of the higher high tides, they are often poorly vegetated due to trampling from cattle and people and are subject to disturbance pressures from

people using the existing informal trail to view the rails who may inadvertently flush them into the open where they are vulnerable to predation. In addition, steadily increasing water levels in Olema Marsh, which is causing conversion of riparian to Freshwater Marsh and Open Water habitat, would potentially decrease suitability of this habitat for black rail.

Over the long-term, slow decay or abrupt breaching of the Giacomini Ranch West Pasture levee would have the potential to increase nesting, foraging, and roosting habitat for rails through creation of more low- and mid-marsh intertidal emergent marsh. This trend would be intensified by sea level rise, with the recently projected rate of 3 feet of sea level rise by 2100 (Overpeck et al. 2006) leading to regular inundation of large portions of the East and West Pastures below 4 ft NAVD88. While this trend could increase available rail habitat in the Giacomini Ranch, it would potentially decrease habitat and numbers of black rails in Olema Marsh, because of a continued rise in water levels. Loss of the West Pasture levee from decay or breaching would reduce the amount of high-tide refugia available. However, this loss would be offset to a large degree by creation of high tide refugia in the northeastern corner of the West Pasture through a 2006 habitat enhancement, the continued presence of the Tomasini Creek levee and higher elevations areas in the West Pasture, and restoration of high marsh/upland ecotone areas in the southern portion of the East Pasture. As with the existing levees, some of these areas may be subject to disturbance or predation pressures from birds and mammals with the exception of the created high tide refugia in the West Pasture.

Construction would be expected to have only negligible adverse effects, if any, on rails, because it would not affect existing rail habitat and would be conducted outside of the documented breeding season (February through August 31).

Other Special Status Species: The effects of Alternative A on other special status species would generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East Pasture restoration component would range from beneficial negligible to moderate adverse.

Species included in this category are federally or state-listed threatened and endangered species that are only occasional visitors or vagrants to the Project Area or were formerly listed as a Species of Concern by the Sacramento office of the USFWS. In general, restoration of the East Pasture and conversion of grassland to marsh, combined with discontinuation of agricultural management, would have negligible to minor beneficial effects over the long-term for most of these species. **California freshwater shrimp** would benefit from discontinuation of levee maintenance and grading and revegetation of the East Pasture southern levee through an increase in overhanging riparian vegetation that would provide sources of food and protection. California brown pelican, green sturgeon, Least Bell's vireo, and **southwestern river otter** would directly benefit from the absence of maintenance and management practices that have the potential to inadvertently affect individuals or populations or to decrease important habitat such as riparian forest and scrub-shrub.

Conversely, negligible to moderate adverse effects would be expected for certain freshwater- and grassland-associated special status species. The American peregrine falcon may benefit negligibly under this alternative during construction from the "flushing" of voles and other rodents, but, over the long-term, loss of grassland habitat would decrease, if not eliminate, rodent numbers and have a negligible adverse effect on this raptor. Species such as sandhill crane and bank swallow may also respond negatively to grassland conversion. **Saltmarsh common yellowthroat** could be adversely impacted by permanent or temporary removal of riparian habitat for construction of the eastern perimeter trail, southern perimeter trail, and the possible future extension of the southern perimeter trail to Inverness Park. Common yellowthroat is known to breed in the first two areas and also breeds in the riparian habitat along Sir Francis Drake Boulevard, but north of where the possible trail extension would occur.

California freshwater shrimp primarily occurs considerably upstream of the Project Area on Lagunitas and Olema Creeks, although it occasionally moves downstream on Lagunitas Creek into the White House Pool reach of Lagunitas Creek. The frequency of occurrence within the Project Area probably depends to a large degree on flow and salinity conditions in this highly variable estuarine zone of the Lagunitas Creek delta. Minor adverse effects would be primarily associated with construction from actions such as levee removal, creek bank grading, and removal of riparian vegetation along the southern portion of the East Pasture, although every effort would be made to preserve as much riparian vegetation as possible. Over the long-term, negligible beneficial effects would be expected from discontinuation of agricultural management practices in Lagunitas Creek.

The largest impact would come from the loss of freshwater habitat for the **northwestern pond turtle**, which would lead to moderate adverse impacts during both construction and project implementation. Construction activities expected to have the most effect would be filling in of the drainage ditches, tidal reconnection of the East Pasture Old Slough and excavation, and construction of the eastern perimeter trail in the riparian habitat adjacent to Tomasini Creek. Following implementation, turtles may become restricted to freshwater portions of Tomasini Creek and pockets of freshwater marsh in the East Pasture along the ranch periphery, although much of the levee system possibly used for aestivation would remain. Over the long-term, the slow decay or abrupt breaching of the West Pasture levees could increase impacts for this species by affecting individuals in the West Pasture, as well as the East Pasture, through conversion of grassland to tidal and brackish marsh. The turtle may possibly move into Olema Marsh, which would have a small net increase in Freshwater Marsh habitat. It has not been documented currently in the marsh, although it occurs in nearby reaches of Lagunitas Creek, so it is possible that habitat conditions are not appropriate for this species (e.g., not enough basking or aestivation sites).

Proposed Additional Mitigation Measures: Standard BMPs would be implemented to reduce construction-related impacts to special status species and wildlife habitats are discussed under Chapter 2. All construction and staging/stockpiling areas would be cleared by biologists prior to use to ensure that there are no nesting or breeding species within the vicinity of the Project Area or staging/stockpile areas prior to implementation. Measures specific to certain species are described below:

California red-legged frog: Construction activities would include removal of roads, fences, and ditches within the Project Area, and excavation of certain portions of the East Pasture Old Slough. Though not documented as supporting breeding habitat, the Old Slough and ditches may provide non-breeding habitat. Construction activities adjacent to or within California red-legged frog habitat documented as breeding habitat would not be conducted until August. Pre-construction surveys would be completed in all construction areas to confirm that no red-legged frogs are present. Frogs encountered would be relocated.

Tidewater goby: Construction would not occur in or directly adjacent to existing tidewater goby habitat during the typical season of reproduction for tidewater goby documented in the literature (late April – early summer; Swift 2003). Prior to construction in the East Pasture Old Slough Pond and ditches, extensive seining would be performed after some dewatering to lower water levels and increase the efficiency of trapping. Minnow traps and dip nets may also be used to increase capture rates. Captured fish would be immediately relocated to Tomasini Creek.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: Work affecting Lagunitas Creek would be conducted after July 15 during low flow periods to minimize impacts to salmonids and other aquatic organisms. BMPs identified in Chapter 2 to decrease sedimentation and impacts to wetlands would mitigate potential impacts associated with selective deconstruction of levees, regrading of creek banks, construction of the eastern perimeter trail, and installation of a pre-fabricated bridge. In addition to these BMPs, other actions would be taken to minimize impacts, including use of an excavator rather than a bulldozer to remove fill and excavation in sensitive creek areas during periods when construction area is exposed to the extent possible.

California black rail and California clapper rail: The East Pasture is across Lagunitas Creek from established habitat for California black rail and California clapper rail, but is not currently identified as rail habitat. The project would comply with directives to not come within 250 feet of established rail habitat prior to August 31 by delaying construction in the northern portion of the East Pasture until September.

California freshwater shrimp: Construction conducted in the White House Pool reach would comply with BMPs identified in Chapter 2 to decrease sedimentation and impacts to wetlands would mitigate potential impacts associated with selective deconstruction of levees, regrading of creek banks, and installation of a pre-fabricated bridge. Pre-construction surveys would be conducted, and any shrimp found would be relocated upstream outside of the construction zone.

Northwestern pond turtle: Prior to construction in the ditches and East Pasture Old Slough, water levels would be lowered to the extent possible, and turtles would be trapped and relocated to appropriate habitat, either Lagunitas Creek or the Martinelli Ponds in the Martinelli Ranch directly to the north of the Giacomini Ranch.

Saltmarsh common yellowthroat: Prior to construction of the southern perimeter trail, the eastern perimeter trail, or the possible future extension of the southern perimeter trail to Inverness Park, pre-construction

surveys would be conducted to ensure that no active nests are present or that nesting and fledging have been completed prior to construction being conducted within or in the immediate vicinity (< 100 feet) of riparian habitat that is either known to support or believed capable of supporting common yellowthroat.

Effectiveness of Proposed Additional Mitigation Measures

California red-legged frog: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Tidewater goby: The proposed mitigation measures would be expected to reduce impacts, but impacts cannot be eliminated. Even with extensive seining, some mortality of fish would be expected, because tidewater goby burrow in the mud, making it extremely difficult to trap all fish. Construction would, therefore, result in incidental take. The proposed mitigation measure would result in this alternative having moderate adverse impacts on tidewater goby during construction.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: The proposed mitigation measures should reduce any potential impacts to negligible levels.

California black rail and California clapper rail: The proposed mitigation measures should reduce any potential impacts to negligible levels.

California freshwater shrimp: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Northwestern pond turtle: The proposed mitigation measures would be expected to reduce impacts, but would not eliminate them. Even with dewatering of the channels and extensive trapping, some mortality of turtles would be expected. The proposed mitigation measure would result in this alternative having moderate adverse impacts on turtles during construction.

Saltmarsh common yellowthroat: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Cumulative Impacts: Based on the similarity in impacts for California red-legged frog between the No Action Alternative and Alternative A, cumulative impacts would be the same as described under the No Action Alternative for California red-legged frog.

Expansion of tidal marsh habitats in the historic wetlands of the Giacomini Ranch—including low-marsh, mid-marsh, high-marsh, and high-marsh/upland ecotone habitats -- would also have a cumulatively beneficial effect with the large number of proposed and ongoing wetland restoration projects in greater San Francisco Bay on California black and clapper rail regional populations. A list of some of these projects can be found at the beginning of this chapter and include Hamilton Wetland Restoration Project, Napa-Sonoma Marsh Restoration Project, and the South Bay Salt Pond Restoration Project. Some winters, when conditions are right, numbers of black rails in Tomales Bay swell with immigrants arriving from San Francisco Bay, some of which remain to breed here (J. Evens, ARA, *pers. comm*.). In addition, California clapper rails from San Francisco Bay occasionally end up in Tomales Bay in fall and early-winter, although their presence here is usually short-lived. (J. Evens, ARA, *pers. comm*.). The increase in marsh area and elevational diversity in both Tomales and San Francisco Bay will increase the amount of breeding habitat and make a significant contribution to reproductive success of the California black rail. The viability of California clapper rail meta-populations will increase with the increase in available habitat, and the overall number of rails is likely to increase. While Tomales Bay will always hold fewer birds than San Francisco Bay marshlands, it will provide – particularly with restoration of the Project Area -- an important alternative to San Francisco Bay that may help long-term viability of regional meta-populations by buffering them from threats arising from stochastic events such as floods or oil spills. With expanded habitat opportunities, Tomales Bay has the potential to be a population source for both species should occurrences elsewhere be drastically affected by stochastic events.

Similar connectivity between San Francisco Bay and Tomales Bay exists in terms of many aquatic species, including shorebirds and waterfowl during both migratory and non-migratory periods (J. Takekawa, USGS, *pers. comm*.). Significant exchange of migratory bird populations occur between these two estuaries, particularly for species such as dunlin (*Calidris alpina*), canvasback (Aythya valisineria), greater scaup (*Aythya marila*), and surf scoter (*Melanitta perspicillata*; Warnock et al. 1995, J. Takekawa, USGS, unpub. data).

Tomales Bay often represents an initial stopover area during spring migration (J. Takekawa, USGS, *pers. comm*.). The direct and indirect implications of implementation of several large restoration projects in both San Francisco and Tomales Bay on these waterbirds are less clear than for rails. Depending upon which restoration approach the salt pond projects adopt in terms of emphasizing tidal marsh versus managed salt pond and the indirect impacts of these projects on external mudflats, these projects could alternately have either adverse or beneficial impacts on shorebird and waterfowl numbers in general and on specific shorebird and duck species in particular. Also, the impacts could be mixed, benefiting some species but adversely affecting others. It is important to remember that, for fish, birds, and some marine mammals, the estuarine wetlands of the greater San Francisco Bay area, including Tomales Bay, function as an interactive mosaic of habitats; estuarine dependent animals may shift from one site to another as conditions change (J. Evens, ARA, *pers. comm*.).

Because many of the San Francisco Bay restoration projects are still being developed or are just being implemented, it is difficult to anticipate how the mosaic of different wetland habitats being created or restored will function in concert with one another and thereby affect viability and population dynamics of shorebirds and waterfowl in general and individual avian species in particular. In general, the proposed project in Tomales Bay, in combination with other restoration projects in San Francisco Bay, would be expected to 1) have a cumulatively beneficial effect to most estuarine dependent species, 2) partially offset and/or complement the effects of projects in San Francisco Bay, OR 3) have no impact at all depending upon the species in question.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The **e**ffects of Alternative A on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from moderate adverse to major beneficial. Under Alternative A, the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. Over the long-term, Alternative A would be expected to have moderate beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some minor adverse impacts during construction in the East Pasture. The largest single change under this alternative relative to the No Action Alternative would come from the substantial conversion of grassland to salt and brackish marsh through breaching of the East Pasture levee, removal of agricultural infrastructure, and tidal reconnection and expansion of the historic tidal slough. Through these actions, more than two-thirds of the East Pasture would be expected to shift from grassland to marsh after a relatively short-term transitional period where weedy, ruderal species may temporarily establish.

The moderate increase in High Value Wildlife Habitats would have a minor beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species potentially increasing measurably. The largest changes in wildlife use under this alternative would be expected to come from increased use of expanded marsh and riparian habitats by waterbirds such as California black rail, and marsh passerines, and of expanded riparian habitats by resident and Neotropical migrant passerines or riparian bird species. As with the No Action Alternative, amphibians and reptiles would be the taxa most adversely affected by implementation of this alternative. Increases in visitation with expanded pubic access facilities would be expected to have negligible to minor adverse effects on wildlife use, particularly along the White House Pool reach of Lagunitas Creek, the eastern perimeter of the Giacomini Ranch near Tomasini Creek, and the Giacomini Ranch north levee trail.

Alternative A would also have a minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions. Construction of Alternative A would generally have only negligible adverse effects on High Value Wildlife Habitats and on use by common wildlife species. Only a negligible beneficial effect would be expected in terms of support of wildlife species in southern portion of the Tomales Bay watershed and in terms of regional population-level effects on species such as rails, shorebirds, and waterfowl from cumulative interactions with other proposed and ongoing projects in San Francisco Bay.

<u>*California red-legged frog*</u>: Similar to the No Action Alternative, Alternative A would have a negligible adverse effect on California red-legged frog breeding habitat units and distribution of the species in the Point Reyes Peninsula Core Area, but a minor adverse effect on distribution of red-legged frogs in the Project Area. Over the long-term, impacts could possibly increase to minor, because degradation of the levees in the West Pasture and sea level rise could cause a measurable effect on breeding habitat units and regional distribution.

Impacts during construction of the wetland mitigation/restoration component in the northern portion of the East Pasture where no breeding has been documented would be expected to be non-existent or very negligible. There is a potential for cumulative impacts with other projects proposed in the Seashore or Marin County region, but, based on evaluation of impacts and proposed mitigation measures for those projects, impacts under this alternative would still be characterized as negligible to minor adverse.

Tidewater goby: Alternative A would have very minor to eventually moderate negligible beneficial effects on tidewater goby in the Project Area after implementation through a potential increase in the areal extent of East Pasture habitat and quality of other existing habitats in Tomasini Creek and the West Pasture, although, over the long term, slow decay or sudden breaching of levees could increase the benefits to tidewater goby by increasing the amount of available habitat. Impacts during construction would be expected to be minor to moderate at most, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: The effects of Alternative A on salmonid rearing and passage habitat in the Project Area would be beneficial minor. Negligible adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration/mitigation component. Standard BMPs and other measures would be used to reduce impacts to negligible levels.

California black rail and California clapper rail: Over the long-term, Alternative A would have a major beneficial effect on California black rail and California clapper rail by substantially increasing appropriate breeding, foraging, and refugia habitat with restoration of more than 250 acres of low-, mid- and high Tidal Salt Marsh adjacent to existing rail habitat. During the transitional period following construction when grassland converts to marsh, however, only negligible to minor beneficial effects would be expected. Impacts during construction to existing rail habitat in the undiked marsh across Lagunitas Creek from the undiked marsh would either be non-existent or negligible, at most, particularly with implementation of proposed mitigation measures.

Other Special Status Species: The effects of Alternative A on other special status species would generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East Pasture restoration component would range from beneficial negligible to moderate adverse. Mitigation measures are proposed where appropriate to reduce impacts to the extent possible.

Alternative B

Analysis: The effects of Alternative B on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from moderate adverse to major beneficial (Table 75). Under Alternative B, the East and West Pastures would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. In the West Pasture, existing informal trail on the West Pasture north levee would be removed, although there would still be the potential for future extension of the southern perimeter trail to Inverness Park. There would be no restoration in Olema Marsh. The levees along and tidegate/culvert in Tomasini Creek would be retained, but not maintained. In the Giacomini Ranch, restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and breaching of levees in the West Pasture. Relative to Alternative A, more tidal channels would be excavated. A freshwater marsh component would be constructed in the Tomasini Triangle in the East Pasture just north of the Giacomini dairy facility to offset increased loss of freshwater marsh in the West Pasture with removal of the Fish Hatchery Creek tidegate and the north levee. The entire southern levee of the East Pasture would be removed and regraded in areas to a more stabile profile and actively revegetated with riparian vegetation.

Wildlife Habitats and General Wildlife Use – Project Implementation: Over the long-term, the Alternative B would be expected to have major beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some minor adverse impacts during construction in the East and West Pastures. As with Alternative A, the largest change under this alternative relative to existing conditions would come from the substantial conversion of grassland or pasture to salt and brackish marsh through removal or breaching of the East and West Pasture levees, removal of agricultural infrastructure such as tidegates, and reconnection and expansion of the tidal channel network in the East Pasture. Through these actions, more than two-thirds of the East Pasture and one-third of the West Pasture would be expected to shift from grassland to tidal or brackish marsh. A transitional period would be expected over the short-term during which, as pasturelands slowly convert through exposure to saline conditions to marsh, restored areas would be dominated by a mix of

non-native opportunistic, moderately salt-tolerant species characteristic of brackish conditions such as brass buttons, annual beard-grass, loosestrife, birdfoot trefoil, curly dock, and others. During this period, impacts to High Value Wildlife habitats would be negligible adverse, because much of the habitat being disturbed consists of highly managed pasturelands: while these types of habitats provide value, they are of lower value than many other unmanaged or less managed habitats.

The major increase in High Value Wildlife Habitats would have a moderate beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species increasing appreciably relative to existing conditions. Some of the largest changes in wildlife use under this alternative relative to Alternative A would be expected to come from increased use of expanded marsh and riparian habitats in the West Pasture. While restoration efforts in the East Pasture would increase, general wildlife use patterns would be relatively similar to those under Alternative A, although High Value Wildlife Habitats in the East Pasture would increase measurably relative to Alternative A.

Under Alternative B, Tidal Salt Marsh, a High Value Wildlife Habitat, would increase more than 40 percent relative to Alternative A. However, the largest increase in High Value Wildlife Habitats under this alternative comes from Tidal Salt Marsh-High/Upland Ecotone. This change results from several factors, including the fact that elevations are generally higher in the West Pasture than in the East Pasture. These elevations, combined with the strong influence from groundwater and drainages flowing from or off of the Inverness Ridge, would maintain many of the Freshwater Marsh, Wet Meadow, and Seasonally Flooded-Ponded Pasture/Grassland habitats that currently exist on the western and southern boundaries of the West Pasture. Tidal Salt Marsh and Tidal Brackish would establish primarily in the lower elevation northern and eastern portions of the West Pasture. The value of the newly created Tidal Salt Marsh and Tidal Brackish Marsh habitats to wildlife would be promoted by the presence of a large tract of undiked tidal salt and brackish marsh habitats immediately adjacent to the East Pasture in the undiked marsh. While not physically contiguous, this proximity between areas encourages a synergistic effect in which wildlife numbers would be higher together than they would have been separately, because of the affinity of many species for unfragmented, larger habitats. In addition, preservation of the shallowly flooded and sparsely vegetated flats in the northeastern corner of the East Pasture would continue to provide alternate high tide habitats for waterfowl and shorebirds during the winter as it does now.

Removal of the Fish Hatchery Creek tidegate would magnify the effects of saltwater intrusion on the West Pasture freshwater marsh, leading to loss of another 1.5 acres relative to the current trend in marsh loss and conditions described under the No Action Alternative and Alternative A. This loss would be offset to some degree by creation of a 5.4-acre freshwater marsh in the Tomasini Triangle portion of the East Pasture, which is above the range of most tides except extreme tides. To preclude influence by even extreme tides, a low berm would be constructed that would also function as high water refugia for wildlife during flooding. While negatively affecting frogs, the conversion of this habitat would benefit passerine bird species, such as salt marsh common yellowthroat, California black rails, and red-winged blackbird, which use tall vegetation for nesting and resting habitat while maintaining close proximity to more open foraging habitat.

In general, acreage of Forested and Scrub Shrub Riparian habitat continues to expand under Alternative B from passive and active revegetation efforts. While the culverted berm through-trail component of the eastern perimeter trail would be replaced with a boardwalk under this alternative, direct impacts to riparian habitat would remain similar to those described under Alternative A. Impacts to groundwater flow from the Point Reyes Mesa would be reduced, however, with a boardwalk, which could have positive effects on the tidewater goby population in Tomasini Creek, as well as on aquatic organisms. The effects of the southern perimeter trail and the possible future extension of that trail to Inverness Park would be identical to those described under Alternative A. There would also be identical adverse effects on riparian habitat and associated species in Olema Marsh from increasing water levels caused by poor drainage from undersized culverts and other factors. Open water and Freshwater Marsh communities would increase as a result.

Habitat changes with restoration in the West Pasture would attract higher numbers of waterbirds such as California black rail, marsh passerines, and resident and Neotropical migrant passerines or riparian bird species. The restored habitats would also benefit generalist waterbirds such as great egret and generalist shorebirds such as willet, godwit, and greater yellowlegs. Salt marsh also provides foraging habitat for raptors species - such as short-eared owl, white-tailed kite, northern harrier, and peregrine falcon - drawn to the site by small vertebrates such as California voles, shrews, and garter snakes. Abundance of raptors such as peregrine falcons would decrease relative to existing conditions, because numbers of rodents would be expected to be lower. Grassland-associated species such as western meadowlarks, savannah sparrows, and

grasshopper sparrows would dwindle in numbers. Conversely, use by species such as osprey could increase, because of the higher abundance of fish and invertebrates in restored West Pasture and East Pasture channels. Abundance and areal extent of fish and invertebrate species would increase in the West Pasture, as well. While filling of the borrow ditch north of the West Pasture north levee would decrease subtidal/intertidal habitat, creation of a new tidal channel linking the undiked marsh to the West Pasture would increase use by aquatic organisms.

As with the No Action Alternative and Alternative A, amphibians and reptiles would be the taxa most adversely affected by implementation of this alternative. Red-legged frog and northwestern pond turtle numbers would drop in the West Pasture with increased tidal influence, but the Tomasini Triangle freshwater marsh may buffer frogs and turtles in the East Pasture from some of the adverse effects of increased tidal inundation in that pasture.

Wildlife Habitats and General Wildlife Use – Long-Term Changes: As described under Alternative A, the brackish and tidal marsh habitats described above would eventually develop after a short-term (~ 10 years) transitional period in which grassland is converted into marsh. These habitats would possibly continue to evolve in the future in response to sea level rise, which could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88 should sea level rise at the currently projected rate of 3 feet by 2100 (Overpeck et al. 2006). This shift would benefit aquatic organisms such as fish and invertebrates, as well as specific avian species such as diving ducks, dabbling ducks, marsh-associated passerines, and other waterbirds.

The long-term effects of Alternative B on wildlife use because of increased visitation would be expected to be very similar to that of Alternative A, with the exception of the removal of the informal path on the Giacomini Ranch north levee. Elimination of this trail would decrease disturbance to wildlife, particularly California black rails that often use the levee on which the trail is built as high tide refugia during storms. While usually only infrequently used, this trail attracts large numbers of birdwatchers during the winter and early spring high tide events who come to see rails. This creates a conflict between these relatively poor-flying birds and visitors such that rails are often flushed from their only refuge, which may increase predation rates relative to areas where access is not allowed or feasible.

Wildlife Habitats and General Wildlife Use – Construction: Construction of Alternative B would generally have minor adverse effects on High Value Wildlife Habitats and use by common wildlife species. Special status species are discussed individually.

Six of the proposed construction activities would have the highest potential to affect both common and special status wildlife species. These activities are regrading of the southern levee in the East Pasture and creek bank to a more stable profile; filling of drainage ditches; tidal reconnection of the East Pasture Old Slough Pond; removal and breaching of levees; removal of the Fish Hatchery Creek tidegate; and filling of the borrow ditch in the undiked marsh north of the West Pasture. Potential impacts to wildlife of changes to ditches and the East Pasture Old Slough are described in detail under Alternative A. Grading of the levee and creek banks and levee removal have the potential to negatively affect aquatic organisms such as California freshwater shrimp, salmonids, southwestern river otter, northwestern pond turtle, and other species through incidental sediment discharge during earthmoving and removal of willows that provide overhanging shade and habitat complexity in surface waters.

Under Alternative B, the borrow ditch in the undiked marsh would be filled, and a new tidal channel created that connects a tidal channel in the undiked marsh with the West Pasture. The Fish Hatchery Creek tidegate and the West Pasture levee would be totally removed. These actions have the potential to negatively affect resident and non-resident aquatic organisms in the creek and borrow ditch such as fish and macroinvertebrates, as well as southwestern river otter and California black rail, through either direct mortality or disruption of the breeding cycle. Non-resident species such as waterfowl, waterbirds, southwestern river otter, and rails would not be impacted unless nesting or breeding was occurring.

Based on the scale and timing of construction activities that could affect High Value Wildlife Habitats and use by common wildlife species, the impacts of construction are characterized as minor adverse. The intensity of construction impacts on special status species is addressed separately below.

Invasive Wildlife Species: Alternative B would have very similar minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions as Alternative A, with increases in numbers and extent of aquatic invasives expected in the West Pasture. The large-scale

conversion of grassland to marsh habitats in the West Pasture would reduce the areal extent of potential habitat for red fox, wild turkey, and feral cats. These species, however, are somewhat opportunistic and would be expected to persist along the edges of the Giacomini Ranch where conditions are appropriate. These species would continue to access East and West Pasture grassland areas for foraging, resting, and other purposes. Monitoring throughout the Seashore for impacts of feral cats and dogs is ongoing (N. Gates, wildlife biologist, Seashore, *pers. comm*.). Should impacts on special status species or other species of concern in the Project Area be detected, removal of feral animals will be implemented as mandated by Park Service Management Policies (NPS 2006, Section 4.4.2.1).

Wildlife Conditions in the Watershed: Tidal reconnection of the 350-acre East Pasture and 200-acre West Pasture to Lagunitas Creek would have a moderate beneficial effect in terms of support of wildlife species in southern portion of the Tomales Bay watershed. As described under Alternative A, tidal reconnection would not only increase the potential for export of sources of carbon such as dissolved and particulate organic carbon, phytoplankton, seeds and other plant matter, and aquatic organisms to the bay, but for access by marine and estuarine species in search of food and refugia. In addition, watershed habitat quality would be improved by discontinuation of levee maintenance, withdrawal of water for irrigation, infrequent pumping of waters from the ranch into Lagunitas Creek, and crossing of Lagunitas Creek by cattle.

California red-legged frog: While freshwater marsh acreage would increase due to creation of freshwater marsh in the East Pasture, Alternative B would still be characterized as having a minor adverse effect on California red-legged frog breeding habitat units in the Point Reyes Peninsula Core Area, at least over the short-term, through further reductions in existing breeding habitat in the West Pasture freshwater marsh. This would have a measurable effect on distribution of the species in the Project Area over the short-term. Over the long-term, however, freshwater marsh creation efforts in the East Pasture would eventually reduce impacts to breeding habitat units and distribution of the species in the Core Area to negligible. This alternative would still have a measurable effect on distribution of species in the Project Area, because the primary breeding habitat available in the Giacomini Ranch would be shifted from the West Pasture to the East Pasture, where breeding has not been documented. Impacts during construction would generally remain negligible despite the increase in the extent of restoration, because most of the heavy construction would occur in the East Pasture, which does not have breeding habitat.

Baseline studies documented two general areas that provide breeding habitat for red-legged frog. The largest of these is the West Pasture freshwater marsh. Breeding also has sporadically occurred in adjacent Fish Hatchery Creek, creating another 1.0 acre of breeding habitat in the West Pasture. The second breeding habitat is in the Olema Marsh and is assumed to comprise all of the areas with Freshwater Marsh and Open Water, which total 39 acres. There is no documented breeding habitat in the East Pasture, although a few adult frogs were observed during baseline surveys (Fellers and Guscio 2002).

Under Alternative B, saltwater intrusion into the West Pasture freshwater marsh would increase, leading to loss of an additional 1.5 acres relative to the No Action Alternative and Alternative A. Over the long-term, this impact could be intensified by sea level rise, which may be rising at a much higher rate than originally predicted. However, at least in the near-term future, the southern one-third of the marsh would still not be affected by salinity intrusion, because of higher elevations and high perennial freshwater inflow from the 1906 Drainage and Inverness Ridge groundwater. As noted under Alternative A, the Park Service is conducting a habitat enhancement project in 2006 that would slightly expand higher elevation Freshwater Marsh habitat in this area by approximately 0.4 acres. Restoration of the West Pasture would also affect non-breeding habitat in the West Pasture. However, under this alternative, most of the tidal and brackish marsh would be concentrated on the eastern and northern boundaries of the pasture, leaving much of the western and southern portions as they exist currently. Riparian habitat along Sir Francis Drake Boulevard would also increase slightly. Therefore, impacts to non-breeding habitat are characterized as minor adverse, at most.

Some of the loss of breeding habitat in the West Pasture freshwater marsh would be offset by creation of the 5.4-acre Tomasini Triangle freshwater marsh in the East Pasture. As described earlier, this marsh would generally be above the extent of high tides, but a low berm would be constructed to preclude tidal influence, as well as promote ponding within the marsh. The berm would also serve as refugia for wildlife during high tides. The marsh was designed based on a water budget developed by the hydrologists (KHE 2006a) to ensure that marsh was appropriately sized to maintain ponded conditions within the deepest portions of the marsh through at least July or August of each year, except perhaps during extreme drought years. Drawdown or drying up of the marsh in the fall would benefit red-legged frogs, because it would discourage successful establishment by bullfrogs, which can be predators of red-legged frog. Bullfrog tadpoles require permanent

ponding. Hydrologic sources for this marsh would principally come from surface run-off generated by the 10-acre rural/lightly urbanized subwatershed to the southeast of the Tomasini Triangle and groundwater inflow from the Point Reyes Mesa. In addition to the Tomasini Triangle, continued increases in water levels in Olema Marsh due to poor drainage would continue to convert Forested and Scrub Shrub Riparian habitat to Freshwater Marsh and Open Water habitat, perhaps providing a very negligible increase in breeding habitat for red-legged frog.

Impacts on red-legged frog during construction would continue to be negligible despite the increase in size of the proposed project. There is no breeding habitat in the East Pasture, and only a few adult frogs have been occasionally been sighted in the East Pasture. Construction activities expected to have the most effect would be filling in of the drainage ditches, tidal reconnection of the East Pasture Old Slough and excavation, and construction of the eastern perimeter trail in the riparian habitat adjacent to Tomasini Creek. Possible mitigation measures are discussed in a separate sub-section below.

Tidewater goby: Alternative B would have moderate to eventually major beneficial effects on tidewater goby in the Project Area after implementation through a potential increase in the areal extent of East and West Pasture habitat and the quality of existing habitats in Tomasini Creek. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Within the Project Area, Acreage of existing tidewater goby habitat in the Giacomini Ranch totals 11.3 acres. This species occurs primarily in three areas within the Giacomini Ranch: Tomasini Creek, the West Pasture Old Slough and possibly Fish Hatchery Creek, and the non-tidal East Pasture Old Slough Pond. A detailed description of these areas can be found under the No Action Alternative. Numbers of tidewater goby in the Project Area have also been relatively low within each of these sites, ranging from five to 22 at most. These sites represent the only known occurrence of this species in the Tomales Bay watershed, as, prior to 2002, the species had last been sighted in the bay in 1953. Genetic analyses indicate that this population is genetically distinct from the nearest existing occurrences of tidewater goby at Salmon Creek Marsh and Rodeo Lagoon (Jacobs and Earl 2005).

Similar to Alternative A, construction of the East Pasture restoration component includes tidal reconnection of the East Pasture Old Slough Pond with Lagunitas Creek and Tomales Bay, with shallow excavation of a portion of the slough to improve hydraulic connectivity of the reconnected slough with Lagunitas Creek. While approximately 0.3 acres of ditches would be filled in as part of the elimination of agricultural infrastructure under Alternative, A, the extent of tidal channel creation would increase under Alternative B, creating approximately 9.3 acres of habitat for tidewater goby. Over the long-term, the effects of Alternative A on tidewater goby habitat would increase slightly relative to short-term conditions, because of a maturation of tidal and brackish habitats following a transitional phase of development. The beneficial effects over the long-term could be intensified by sea level rise, which would increase the extent of area subject to regular inundation by tides.

During the transitional phase, existing habitat conditions would be maintained in Tomasini Creek through retention of the tidegates and associated hydrologic infrastructure. Retention of the tidegates and flashboard dam structure on Tomasini Creek would maintain existing subtidal habitat conditions in the channel, as the structure prevents complete drainage during low tides. The tidegate, along with natural gravel bar features create residual brackish pool habitat that provides habitat for the tidewater goby, despite the fact that the substrate and flow conditions are probably not optimal. Relative to Alternative A, impacts to Tomasini Creek would be reduced by replacement of the culverted berm through-trail component of the eastern perimeter trail with a boardwalk that would improve flow conditions from seeps on the Point Reyes Mesa into the creek. These seeps may play a considerable role in reducing salinities in this reach of the creek and thereby creating appropriate habitat conditions for the tidewater goby. A brackish water species, tidewater goby is sensitive to higher salinity waters approaching marine salinities (~34 ppt), preferring salinities in the 12 ppt range (Swift 2003).

Restoration would also increase the areal extent of habitat and quality of existing tidewater goby habitat in the West Pasture. The primary restoration actions in the West Pasture involve breaching or removal of levees and tidegates. No tidal channel creation would be performed, but tidal channels would be expected to form naturally in response to increased tidal inundation, particularly in areas where remnant sloughs are still visible.

Because construction in the West Pasture would not directly affect tidewater goby habitat, impacts during

construction would still be characterized as moderate adverse due to direct impacts of the East Pasture Old Slough Pond. Possible mitigation measures are discussed in a separate sub-section below.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: The effects of Alternative B on salmonid rearing and passage habitat in the Project Area would be beneficial moderate. Potential minor adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration component due to removal of the Fish Hatchery Creek tidegate and filling of the borrow ditch adjacent to the West Pasture north levee.

As discussed under the No Action Alternative, the Project Area does not represent a potential breeding or spawning area for steelhead, coho or Chinook salmon, but rather important feeding, resting, and refugia habitat for salmonids as they migrate to the ocean or move upstream to spawning grounds. Steelhead has recently been found in Fish Hatchery Creek, Tomasini Creek, the section of Lagunitas Creek in the Project Area, and in Bear Valley Creek upstream of Olema Marsh. Coho occur in Lagunitas Creek and in Tomasini Creek. Chinook has been documented in upstream portions of Lagunitas Creek, but they have not been captured as yet in the Project Area. Salmonid presence in these watersheds indicates that, while impediments, the levees and tidegate facilities are still allowing some degree of fish passage. The levees severely constrain the potential for development of off-channel or rearing habitat on Tomasini Creek and Lagunitas Creek. Fish Hatchery Creek is not leveed within the West Pasture, although it is infrequently dredged. On Bear Valley Creek, Levee Road, Bear Valley Roads, and their culverts limit both passage and rearing potential, along with the indistinct flow path in Olema Marsh created by excessive impoundment of waters.

The largest benefit to salmonids under this alternative would come from the appreciable increase in potential rearing habitat from full tidal reconnection of the East and West Pastures with Lagunitas Creek. Aquatic edge habitat would increase approximately 28 percent relative to existing conditions, with edge habitat in the Project Area climbing from approximately 15 miles under existing conditions to 19 miles under Alternative B. While approximately 0.3 acres of ditches would be eliminated, a total of 9.3 acres of new and restored tidal channel would be created in the East Pasture Old Slough.

This alternative would also have moderate beneficial effects on passage and rearing conditions. Breaching of the levees and removal of the Fish Hatchery Creek tidegate would improve quality and accessibility of another 4.6 acres of tidally influenced channel. In addition, removal of the Fish Hatchery tidegate could increase the potential for passage for steelhead, which have been observed in the creek. There would be no change in Olema Marsh, other than water levels would be expected to continue rising, which may further affect the ability of salmonids to reach upstream portions of the watershed.

Construction would have the potential for only minor adverse impacts associated removal of the Fish Hatchery Creek tidegate, filling in of the borrow ditch, and grading and removal of levees and creek banks. The latter could potentially impact salmonids and other aquatic organisms though incidental sediment discharge and possible removal of riparian vegetation, although every effort would be made to retain as much of the established vegetation as possible. Construction would be scheduled to ensure that grading does not begin before July 15, which is the end of the typical period for smolt outmigration. Possible mitigation measures are discussed in a separate sub-section below.

California black rail and California clapper rail: Alternative B would have very similar major beneficial effects to Alternative A in terms of increasing habitat for California black rail and California clapper rail, with the proposed project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh adjacent to existing rail habitat. During the transitional period following construction, only negligible to minor beneficial effects would be expected, as grassland begins the process of converting to brackish and tidal marsh, leading to temporary establishment of a more weedy, ruderal habitat that would have less benefits for rails. Relative to Alternative A, impacts during construction would increase to moderate adverse, because of construction actions on and near the north levee in the West Pasture.

As discussed under the No Action Alternative, breeding populations of California black rail have primarily occur in the undiked marsh north of the Giacomini Ranch and in Olema and Bear Valley marshes in intermittent years (ARA 2002). Small numbers (1-2 individuals) also occurred within the Project Area in brackish and freshwater marsh, with possible breeding one year in the West Pasture freshwater marsh (ARA 2002). Clapper rail historically occurred in Tomales Bay, and individuals were sighted in the undiked marsh north of

the Giacomini Ranch during fall and winter between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). There have been no sightings since then, however, and there are no recent breeding records either from the bay.

Under Alternative B, habitat for the black rail in the Project Area and adjacent undiked marsh to the north of the Giacomini Ranch would almost triple from approximately 120 acres to more than 350 acres with restoration of the East and West Pastures. The restoration would provide benefits primarily to black rail, although clapper rail could benefit substantially, as well, from establishment of low and high Tidal Salt Marsh habitats. While rails do not currently use the East Pasture, the proximity of the restoration area to the undiked marsh makes it more likely that rails would expand into the East Pasture and use the newly created habitat. As with Alternative A, steadily increasing water levels in Olema Marsh would potentially decrease suitability of this habitat for black rail by converting riparian habitat to Freshwater Marsh and Open Water habitat,

As noted earlier, this alternative greatly increases the amount of high marsh/upland ecotone habitat relative to Alternative A. This change probably results from the generally higher elevations present in the West Pasture compared to the East Pasture, although some portion of that gain in ecotone habitat would come from the East Pasture. Mid-marsh habitats would be concentrated primarily in the lower elevation northern and eastern portions of the West Pasture, with ecotonal habitats fringing these areas to the south and west. Through filling of the borrow ditch, connectivity of these new mid-marsh and high marsh/upland ecotone habitats to existing habitat in the undiked marsh north of Giacomini Ranch would be greatly enhanced and would strongly increase the potential for establishment of restored habitats in the West Pasture by rails. Increases in high marsh habitat in Giacomini Ranch could, at least temporarily, offset any decreases in this habitat in the undiked marsh habitat north of the ranch from accelerated rates of bank slumping and channel widening that might be potentially being caused by a non-native isopod. This isopod would be likely to move south into the Giacomini Ranch once tidal connection and habitats are restored.

High tide refugia rails would continue to exist in the refugia created in the northeastern corner of the West Pasture through a separate enhancement project conducted in 2006; on the Tomasini Creek levees; and in the higher elevation portions of the East and West Pasture. This alternative would also incorporate a component that would link the created refugia in the West Pasture with the alluvial levees in the undiked marsh to improve habitat connectivity. While removal of the north levee in the West Pasture could be viewed as a potential impact in terms of reducing high tide refugia, these levees do not provide optimal refugia habitat, because they poorly vegetated due to trampling from cattle and people and subject to disturbance pressures from people using the existing informal trail to view the rails who often inadvertently flushed them into the open where they are vulnerable to predation. Under Alternative B, removal of the levees would result in removal of this trail, which would be replaced with a viewing area near the road pull-out.

Construction would be expected to have potential moderate adverse effects on rails. While construction would be conducted outside of the documented breeding season for clapper rails (February through August 31), the filling of the borrow ditch and extension of the tidal channel in the undiked marsh into the West Pasture could negatively affect rails through temporary impacts to habitat and disturbance from noise. Possible mitigation measures are discussed in a separate sub-section below.

Other Special Status Species: The effects of Alternative B on other special status species would generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East and West Pasture restoration components would range from beneficial negligible to moderate adverse. Proposed mitigation measures proposed for some of these species are described in a separate sub-section below.

Species included in this category are federally or state-listed threatened and endangered species that are only occasional visitors or vagrants to the Project Area or were formerly listed as a Species of Concern by the Sacramento office of the USFWS. These species include **California freshwater shrimp**, California brown pelican, green sturgeon, Least Bell's vireo, American peregrine falcon, sandhill crane, bank swallow, **northwestern pond turtle**, **southwestern river otter**, and **saltmarsh common yellowthroat**. Impacts from implementation of this alternative would be beneficial or only have negligible to minor adverse effects from conversion in habitat type for most of these species, except northwestern pond turtle, which is characterized as having moderate adverse effects. A detailed description of effects can be found under Alternative A.

California freshwater shrimp primarily occurs considerably upstream of the Project Area on Lagunitas and Olema Creeks, although it occasionally moves downstream on Lagunitas Creek into the White House Pool reach of Lagunitas Creek. The frequency of occurrence within the Project Area probably depends to a large degree on flow and salinity conditions in this highly variable estuarine zone of the Lagunitas Creek delta. Minor adverse effects would be primarily associated with construction from actions such as levee removal, creek bank grading, and removal of riparian vegetation along the southern portion of the East Pasture, although every effort would be made to preserve as much riparian vegetation as possible. Over the long-term, negligible beneficial effects would be expected from discontinuation of agricultural management practices in Lagunitas Creek.

Similar to red-legged frog, **northwestern pond turtles** would be negatively affected by conversion of grassland and freshwater marsh habitats to tidal and brackish marsh habitats in both the East and the West Pastures. Construction activities expected to have the most effect would be filling in of the drainage ditches, tidal reconnection of the East Pasture Old Slough and excavation, construction of the eastern perimeter trail along Tomasini Creek, and removal of the Fish Hatchery Creek tidegate. Following implementation, turtles may become restricted to freshwater portions of Tomasini Creek and Fish Hatchery Creek and pockets of freshwater marsh along the ranch periphery. In the East Pasture, the Tomasini Creek levee would remain, which could maintain aestivation habitat.

As with Alternative A, **saltmarsh common yellowthroat** could be adversely impacted by permanent or temporary removal of riparian habitat for construction of the eastern perimeter trail, southern perimeter trail, and the possible future extension of the southern perimeter trail to Inverness Park. Common yellowthroat is known to breed in the first two areas and also breeds in the riparian habitat along Sir Francis Drake Boulevard, but north of where the possible trail extension would occur.

Proposed Additional Mitigation Measures: Standard BMPs would be implemented to reduce impacts to special status species and wildlife habitats are discussed under Chapter 2. All construction and staging/stockpiling areas would be cleared by biologists prior to use to ensure that there are no nesting or breeding species within the vicinity of the Project Area or staging/stockpile areas prior to implementation. Measures specific to certain species are described below:

California red-legged frog: Construction activities would include removal of ditches excavation of certain portions of the East Pasture Old Slough. Though not documented as supporting breeding habitat, the Old Slough and ditches and other areas within the East and West Pastures may provide non-breeding habitat. Construction activities adjacent to or within California red-legged frog habitat documented as breeding habitat would not be conducted until August. Pre-construction surveys would be completed in all construction areas to confirm that no red-legged frogs are present. Frogs encountered would be relocated.

Tidewater goby: Construction would not occur in or directly adjacent to existing tidewater goby habitat during the typical season of reproduction for tidewater goby documented in the literature (late April – early summer; Swift 2003). Prior to construction in the East Pasture Old Slough Pond, ditches, and Fish Hatchery Creek for removal of the tidegate, extensive seining would be performed after some dewatering to lower water levels and increase the efficiency of trapping. Minnow traps and dip nets may also be used to increase capture rates. Captured fish would be immediately relocated to Tomasini Creek, the West Pasture Old Slough, or other appropriate habitat.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: Work affecting Lagunitas Creek and Fish Hatchery Creek would be conducted after July 15 to minimize impacts to salmonids. BMPs identified in Chapter 2 to decrease sedimentation and impacts to wetlands would mitigate potential impacts associated with selective deconstruction of levees, regrading of creek banks, construction of the eastern perimeter trail, and installation of a pre-fabricated bridge. In addition to these BMPs, other actions would be taken to minimize impacts, including use of an excavator rather than a bulldozer to remove fill and excavation in sensitive creek areas during periods when construction area is exposed to the extent possible. During removal of the tidegate on Fish Hatchery Creek, water levels within the construction zone would be lowered, and extensive seining would be performed to remove any salmonids prior to construction. Captured fish would be relocated to appropriate upstream habitats.

California black rail and California clapper rail: The proposed project would comply with directives to not come within 250 feet of established rail habitat prior to August 31 by delaying construction in the northern portion of the East Pasture until September.

California freshwater shrimp: Construction conducted in the White House Pool reach would comply with BMPs identified in Chapter 2 to decrease sedimentation and impacts to wetlands would mitigate potential impacts associated with selective deconstruction of levees, regrading of creek banks, and installation of a pre-fabricated bridge. Pre-construction surveys would be conducted, and any shrimp found would be relocated upstream outside of the construction zone.

Northwestern pond turtle: Prior to construction in the ditches, East Pasture Old Slough, and Fish Hatchery Creek, water levels would be lowered to the extent possible, and turtles would be trapped and relocated to appropriate habitat, either Lagunitas Creek or the Martinelli Ponds in the Martinelli Ranch directly to the north of the Giacomini Ranch.

Saltmarsh common yellowthroat: Prior to construction of the southern perimeter trail, the eastern perimeter trail, or the possible future extension of the southern perimeter trail to Inverness Park, pre-construction surveys would be conducted to ensure that no active nests are present or that nesting and fledging have been completed prior to construction being conducted within or in the immediate vicinity (< 100 feet) of riparian habitat that is either known to support or believed capable of supporting common yellowthroat.

Effectiveness of Proposed Additional Mitigation Measures

California red-legged frog: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Tidewater goby: The mitigation measures would be expected to reduce impacts, but impacts cannot be eliminated. Even with extensive seining, some mortality of fish would be expected, because tidewater goby burrow in the mud, making it extremely difficult to trap all fish. Construction would, therefore, result in incidental take. The proposed mitigation measures would result in this alternative having moderate adverse impacts on tidewater goby during construction.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: The proposed mitigation measures should reduce any potential impacts to minor levels.

California black rail and California clapper rail: The proposed mitigation measures should result in no more than moderate adverse impacts on rails during construction.

California freshwater shrimp: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Northwestern pond turtle: The mitigation measures would be expected to reduce impacts, but would not eliminate them. Even with dewatering of the channels and extensive trapping, some mortality of turtles would be expected. The proposed mitigation measures would result in this alternative having moderate adverse impacts on turtles during construction.

Saltmarsh common yellowthroat: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Cumulative Impacts: Cumulative impacts would be the same as the No Action Alternative for the California red-legged frog and Alternative A for California black rails, California clapper rails, shorebirds, and waterfowl.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative B on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from moderate adverse to major beneficial. Under Alternative B, the East and West Pastures would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. Over the long-term, Alternative B would be expected to have major beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some minor adverse impacts during construction in the East and West Pastures. As with Alternative A, the largest change under this alternative relative to existing conditions would come from the substantial conversion of

grassland or pasture to salt and brackish marsh through removal or breaching of the East and West Pasture levees, removal of agricultural infrastructure such as tidegates, and reconnection and expansion of the tidal channel network in the East Pasture. Through these actions, more than two-thirds of the East Pasture and one-third of the West Pasture would be expected to shift from grassland to tidal or brackish marsh. A transitional period would be expected over the short-term during which, as pasturelands slowly convert through exposure to saline conditions to marsh. These habitats would possibly continue to evolve in the future in response to sea level rise, which could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88 should sea level rise at the currently projected rate of 3 feet by 2100 (Overpeck et al. 2006).

The major increase in High Value Wildlife Habitats would have a moderate beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species increasing appreciably relative to existing conditions. Some of the largest changes in wildlife use under this alternative relative to Alternative A would be expected to come from increased use of expanded marsh and riparian habitats in the West Pasture. While restoration efforts in the East Pasture would increase, general wildlife use patterns would be relatively similar to those under Alternative A. Construction of Alternative B would generally have minor adverse effects on High Value Wildlife Habitats and use by common wildlife species: effects on special status species is summarized below. Increases in visitation with expanded pubic access facilities would be expected to have negligible to minor adverse effects on wildlife use, particularly along the White House Pool reach of Lagunitas Creek and the eastern perimeter of the Giacomini Ranch near Tomasini Creek, although elimination of the Giacomini Ranch north levee trail would have a beneficial effect on special status species such as California black rails.

Alternative B would have very similar minor adverse effects as Alternative A on the number of non-native invasive wildlife species that would be present, with increases in numbers and extent of aquatic invasives expected from restoration of the West Pasture. Tidal reconnection of the 350-acre East Pasture and 200-acre West Pasture to Lagunitas Creek would have a moderate beneficial effect in terms of support of wildlife species in the southern portion of the Tomales Bay watershed. For the San Francisco Bay region in general, the proposed project, in combination with other proposed and ongoing restoration projects, would be expected to generally have a cumulatively negligible beneficial effect on regional populations of California black rails, California clapper rails, waterfowl, and shorebirds.

California red-legged frog: While freshwater marsh acreage would increase due to creation of freshwater marsh in the East Pasture, Alternative B would still be characterized as having a minor adverse effect on California red-legged frog breeding habitat units in the Point Reyes Peninsula Core Area, at least over the short-term, through further reductions in existing breeding habitat in the West Pasture freshwater marsh. This would have a measurable effect on distribution of the species in the Project Area over the short-term. Over the long-term, however, freshwater marsh creation efforts in the East Pasture would eventually reduce impacts to breeding habitat units and distribution of the species in the Core Area to negligible. This alternative would still have a measurable effect on distribution of species in the Project Area, because the primary breeding habitat available in the Giacomini Ranch would be shifted from the West Pasture to the East Pasture, where breeding has not been documented. Impacts during construction would generally remain negligible despite the increase in the extent of restoration, because most of the heavy construction would occur in the East Pasture, which does not have breeding habitat. There is a potential for cumulative impacts with other projects proposed in the Seashore or Marin County region, but, based on evaluation of impacts and proposed mitigation measures for those projects, impacts under this alternative would still be characterized as negligible to minor adverse.

Tidewater goby: Alternative B would have moderate to eventually major beneficial effects on tidewater goby in the Project Area after implementation through a potential increase in the areal extent of East and West Pasture habitat and the quality of existing habitats in Tomasini Creek. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: The effects of Alternative B on salmonid rearing and passage habitat in the Project Area would be beneficial moderate. Potential minor adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration component due to removal of the Fish Hatchery Creek and filling of the borrow ditch adjacent to the West Pasture north levee.

California black rail and California clapper rail: Alternative B would have very similar major beneficial effects to Alternative A in terms of increasing habitat for California black rail and California clapper rail, with the proposed project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh adjacent to existing rail habitat. During the transitional period following construction, only negligible to minor beneficial effects would be expected, as grassland begins the process of converting to brackish and tidal marsh, leading to temporary establishment of a more weedy, ruderal habitat that would have less benefits for rails. Relative to Alternative A, impacts during construction would increase to moderate adverse, because of construction actions on and near the north levee in the West Pasture.

Other Special Status Species: The effects of Alternative B on other special status species would generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East and West Pasture restoration components would range from beneficial negligible to moderate adverse.

Alternative C

Analysis: The effects of Alternative C on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from major adverse to major beneficial (Table 75). As with Alternative B, the East and West Pastures would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. However, under this alternative, there would also be restoration of Olema Marsh. Some of the other major changes under Alternative C that would affect wildlife would be the partial realignment of Tomasini Creek into one of its historic alignments, native grass revegetation efforts at higher elevations of the East Pasture grasslands, and complete removal of levees from the West Pasture. Relative to Alternative B, tidal channel excavation, revegetation, and non-native invasive plant removal efforts in the East and West Pastures would be increased.

It should be noted that the Olema Marsh, and the ponded conditions that maintain habitat described above for the red-legged frog, also represents the barrier to steelhead and potentially salmon access to Bear Valley Creek. The physical conditions necessary to support breeding habitat of the red-legged frog are the same conditions which limit or eliminate potential salmonid access to the watershed. Evaluation of these potentially conflicting conditions warrants the extended discussion below.

Wildlife Habitats and General Wildlife Use – Project Implementation: Over the long-term, Alternative C would be expected to have major beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some moderate adverse impacts during construction in the Project Area. Under this alternative, the dramatic rate of gain in High Value Wildlife Habitats between each of the alternatives would slow considerably. While Alternative B represented an almost 40 percent increase in High Value Wildlife Habitats from Alternative A, Alternative C would only increase the acreage of High Value Wildlife Habitats relative to Alternative B by 3 percent.

As with Alternative B, the largest change under this alternative relative to existing conditions would come from the substantial conversion of grassland or pasture to salt and brackish marsh through removal or breaching of the East and West Pasture levees, removal of agricultural infrastructure such as tidegates, and reconnection and expansion of the tidal channel network in the East Pasture. Through these actions, more than two-thirds of the East Pasture and one-third of the West Pasture would be expected to shift from grassland to tidal or brackish marsh or to remain shallowly flooded, sparsely vegetated flats such as the existing shallow shorebird area in the East Pasture. A transitional period would be expected over the short-term during which, as pasturelands slowly convert through exposure to saline conditions to marsh, restored areas would be dominated by a mix of non-native opportunistic, moderately salt-tolerant species characteristic of brackish conditions such as brass buttons, annual beard-grass, loosestrife, birdfoot trefoil, curly dock, and others. During this period, impacts to High Value Wildlife habitats in the Giacomini Ranch would be considered negligible adverse, because much of the habitat disturbed consists of highly managed pasturelands: while these types of habitats provide value, they are of lower value than many other unmanaged or less managed habitats.

Most of the gain in High Value Wildlife Habitat under Alternative C would come from restoration of Olema Marsh. While active native grass revegetation efforts in the Giacomini Ranch would more than quadruple the extent of this habitat relative to Alternative B, this habitat was considered to have a lower priority in an estuarine context than many of the other aquatic wildlife habitats, although it would serve an important role as refugia for aquatic species and home to many terrestrial species.

The major increase in High Value Wildlife Habitats would have a moderate beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species increasing appreciably relative to existing conditions. In general, the trends in wildlife use predicted under Alternative B would continue under Alternative C. Some of the largest changes in wildlife use under this alternative relative to Alternative B would be expected to come from increased use of expanded marsh and riparian habitats in Olema Marsh and Tomasini Creek. While restoration efforts in the East Pasture and the West Pasture would increase, general wildlife use patterns would be relatively similar to those under Alternative B, probably due to the small increase between Alternatives B and C in acreage of High Value Wildlife Habitats in the Giacomini Ranch.

Currently, impoundment of waters within Olema Marsh precludes tidal influence. Removal of a small berm that is limiting outflow of waters from the marsh would improve hydraulic connectivity with Lagunitas Creek. The dewatering expected with removal of the berm and possible replacement of the Levee and Bear Valley Road culverts would dramatically lower water surface levels in Olema Marsh by as much as 1- to 4 feet or more. In addition, replacement of the Levee Road culvert would lower the tidal threshold such tides lower than the current threshold of 4.5 feet MLLW would be able to flow into the marsh. These changes, combined with subsidence or lowering of ground surface elevations in response to dewatering (see discussion under Geologic Resources), would greatly increase the extent of area that is tidally influenced within the marsh to approximately between 10 and 20 acres (KHE 2006a). However, strong permanent sources of freshwater flow to Olema Marsh from Bear Valley Creek and Inverness Ridge in the form of groundwater and small drainages would likely further reduce the salinity of tidal waters flowing into the marsh from Lagunitas Creek. Salinities in Lagunitas Creek at its confluence with Bear Valley Creek already typically fall within the brackish range (0.5 – 20 ppt), because of where the marsh is located along the salinity gradient in the estuary.

These changes would have profound implications for the mix of High Value Wildlife Habitats that would develop over the long-term. Under Alternative C, acreage of Tidal Salt Marsh, a High Value Wildlife Habitat, would remain very similar to that under Alternative B. However, Tidal Brackish Marsh would increase more than 100 percent relative to Alternative B, because of increased tidal influence in Olema Marsh. Forested and Scrub Shrub Riparian Habitat would increase by as much as 16 percent, due in large part to lowered water surface levels in Olema Marsh. Under existing conditions, riparian habitat along the fringe of the Freshwater Marsh was essentially being drowned by the steady increases in water surface levels that appeared to be occurring over the last decade. Ultimately, these increases in riparian habitat would offset negligible losses (~0.05 acres) associated with widening of the Bear Valley Creek outlet channel when and if the Levee Road culvert is replaced. Increases in Tidal Brackish Marsh and Forested and Scrub Shrub Riparian habitats would come at the expense of decreases in Freshwater Marsh habitat, which would drop by as much as 10- 20 percent under Alternative C.

As with the Giacomini Ranch, a relatively short-term (~10 years) period would be expected to occur in which the marsh adjusts to these altered conditions. During this period, considerable die-back of Freshwater Marsh vegetation would take place, leaving dead stands of tall emergents and larger expanses of open water areas. Decomposition of vegetation, combined with other chemical changes in the soils related to dewatering and subsidence, would potentially cause short-term water quality problems, specifically increases in nutrients and acidity and possibly decreases in dissolved oxygen. Because of the buffering influence of flow from Bear Valley Creek and Inverness Ridge groundwater and drainage flow during this period, problems with acidity would temporary and transient in nature. These trends in vegetation die-back and water quality would continue until equilibrium with changed conditions is reached at which point vegetation would begin to reestablish, creating the new mix of vegetation communities predicted over the long-term. While water levels would drop under Alternative C relative to existing conditions, the marsh would continue to be permanently ponded due to the strong amount of permanent freshwater inflow from Bear Valley Creek, Inverness Ridge groundwater and drainages, and, to some extent, Lagunitas Creek. Total water depths would simply be lower, and there may be more pockets of seasonally flooded habitats on the perimeter. Some changes may also occur in Bear Valley Marsh, because of the indirect effect that lowering of water surface levels in Olema Marsh would have on upstream water levels in Bear Valley Creek. Changes in this marsh would not be expected to be as dramatic. Overall these conditions would result in moderate adverse impacts to High Value Habitat in the short-term, though in the long-term, these conditions would stabilize, resulting in long-term major beneficial effects on High Value Habitat as natural processes are restored.

From a wildlife perspective, the short-term effects of these changes in Olema Marsh would generally range from minor to moderate adverse. Resident and Neotropical migrant birds and other animals associated with riparian habitat would probably continue to use the fringing riparian habitat, most of which would not be

directly affected by the expected changes. Some birds would also continue to nest in emergent vegetation, even as it dies back, while standing water remains in marsh (e.g. marsh wrens, red-winged blackbirds). As water levels decline, a decrease in the presence of migratory waterfowl may be observed, particularly those species that forage at greater depths. Shallower water depths may benefit aerial foragers (e.g. swallows) over Olema Marsh by increasing insect populations. Aquatic species such as threespine stickleback and invertebrates would be adversely affected as water quality conditions reach equilibrium. Amphibians such as California red-legged frog, Pacific tree frog, and northwestern pond turtle would likely leave the marsh during this period, perhaps moving into adjacent riparian habitat, Bear Valley Creek Marsh, or into the Olema Creek watershed less than 0.5 miles away. Some mortality of these species may occur, although construction itself is expected to have minor to moderate adverse impacts. Abundance of opportunistic species such as southwestern river otter and certain bird species may increase temporarily within the marsh in response to the sudden increase in food availability.

Over the long-term, as brackish vegetation and freshwater marsh habitat rebounds in Olema Marsh, a recovery of freshwater marsh-associated species (e.g. marsh wrens, red-winged blackbirds, rails) would be expected. There is potential for more waterfowl nesting by species such as mallard and gadwall as vegetative cover reestablishes around the edges and in Olema Marsh. Abundance of certain waterbirds such as California black rail may increase. An increase in riparian-associated bird species abundance and diversity would be expected over the long-term due to expansion of riparian habitat as water levels within the marsh drop. Species such as warbling vireo, Swainson's thrush, and Wilson's warbler would be expected to benefit as structure complexity returns to riparian habitat at Olema Marsh.

One of the other actions under Alternative C is partial realignment of Tomasini Creek into one its historic flow paths. Under this alternative, the existing Tomasini Creek channel would remain, as would the tidegates and flashboard dam structure, but the old channel would be leveed off from the new one. This change would convert the old Tomasini Creek channel into more of a backwater slough that would continue to receive freshwater influence from groundwater flowing off the Point Reyes Mesa, as well as occasional overbank flooding from Tomasini Creek during large storm events. This change would increase the areal extent of Muted and Tidal Subtidal/Intertidal habitats within the East Pasture. Abundance and areal extent of fish and invertebrate species would be expected to increase, as a result. Salmonids such as steelhead and coho would now be moving through the East Pasture on their way to or from spawning grounds in the upper watershed and would be better able to take advantage of the larger extent of aquatic edge or potential refugia habitat provided by the enhanced tidal channel network in the East Pasture. A similar beneficial effect would be expected over the long-term for tidewater goby. The old Tomasini Creek channel would continue to provide habitat for salmonids and tidewater goby, with the tidegate/flashboard still maintaining permanent subtidal conditions.

In addition, under this alternative, the through-trail component of the eastern perimeter trail would be eliminated in favor of constructing two spur trails. This would decrease potential impacts to the Tomasini backwater slough from erosion and permanent and temporary removal of riparian vegetation. It would also benefit riparian associates such as Swainson's thrush and saltmarsh common yellowthroat that uses the riparian vegetation and Mesic Coastal Scrub habitats on the Point Reyes Mesa through decreasing impacts from construction- and project-related habitat loss and possible disturbance from trail users.

Wildlife Habitats and General Wildlife Use – Long-Term Changes: As discussed under Alternative A for Giacomini Ranch, the brackish, tidal marsh, and riparian habitats described would eventually develop after a short-term (~ 10 years) transitional period in which grassland is converted into marsh. In addition, Olema Marsh would also respond to dramatic changes in physical conditions with a short-term transitional period in which existing vegetation would die-back considerably and create more expanses of open water until equilibrium is reached at which point new habitats would begin to develop. Over the long-term, these habitats would possibly continue to evolve in response to sea level rise, which could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88 should sea level rise at the currently projected rate of 3 feet by 2100 (Overpeck et al. 2006). This change would also affect Olema Marsh, as impoundment would no longer preclude inflow from Lagunitas Creek. However, predicting the magnitude of this change is difficult given the adaptive restoration approach proposed for this component of the proposed project. In general, sea level rise would intensify the conversion of Freshwater Marsh to Tidal Brackish Marsh.

Relative to Alternative B, long-term impacts related to disturbance of wildlife by visitors would decrease somewhat, because the eastern perimeter trail would be converted from a through-trail to two (2) spur trails. Construction of the southern perimeter trail would greatly increase wildlife viewing opportunities on this reach of Lagunitas Creek and could increase adverse effects on wildlife, depending on visitation numbers. However,

this area already receives a considerable amount of disturbance from users of the existing informal path, Giacomini Ranch maintenance, users of the Green Bridge and White House Pool County parks, and residents along Levee Road. In this context, impacts relative to existing conditions would be expected to be only negligible adverse. Under Alternative C, spur trails would be retained on the eastern perimeter – an extension of the Tomales Bay spur trail and the Mesa Road spur trail. Because of the disturbed nature of the Mesa Road spur trail area (e.g., ranch housing, heavy vehicle traffic for ranch maintenance, use of the Giacomini Hunt Lodge, and gardening operations), the impact of this public access element on wildlife use within the highly disturbed riparian corridor would be negligible, at most.

Wildlife Habitats and General Wildlife Use – Construction: Construction of Alternative C would generally have minor adverse effects on High Value Wildlife Habitats and use by common wildlife species. Special status species are discussed individually.

Nine of the proposed construction activities would have the highest potential to affect both common and special status wildlife species. These activities are regrading of the southern levee in the East Pasture and creek bank to a more stable profile; filling of drainage ditches; tidal reconnection of the East Pasture Old Slough Pond; removal and breaching of levees; removal of the Fish Hatchery Creek tidegate; filling of the borrow ditch in the undiked marsh north of the West Pasture; partial realignment of Tomasini Creek; shallow excavation of Bear Valley Creek, and possible replacement of the Levee Road and Bear Valley Road culverts. Potential impacts to wildlife from most of these construction activities are discussed under Alternatives A and B. As described in Chapter 2, standard BMPs would be employed to minimize sediment discharge, and efforts would be made to preserve larger willows and other riparian trees during regrading of the creek bank.

Under Alternative C, the Bear Valley Creek channel would be shallowly excavated using either an excavator working from adjacent uplands or a dragline. Culverts on Bear Valley Creek at Bear Valley Road and Levee Road may also be replaced with new culverts or bridges, and the channel bottom, excavated to improve hydraulic conveyance. Tomasini Creek would be partially realigned into one of its historic alignments. These construction activities have the potential to negatively affect aquatic organisms such as fish (e.g., salmonids) and potentially macroinvertebrates, as well as amphibians and reptiles. Non-resident species such as waterfowl, waterbirds, southwestern river otter, and rails would not be impacted unless nesting or breeding was occurring.

Based on the scale and timing of construction activities that could affect High Value Wildlife Habitats and use by common wildlife species, the impacts of construction are characterized as minor to moderate adverse. The intensity of construction impacts on special status species is addressed separately below.

Invasive Wildlife Species: Alternative C would have a very similar minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions as Alternatives A and B, with increases in numbers and extent of aquatic invasives expected in Olema Marsh.

Wildlife Conditions in the Watershed: Tidal reconnection of the Giacomini Ranch and Olema Marsh to Lagunitas Creek would have a moderate beneficial effect in terms of support of wildlife species in southern portion of the Tomales Bay watershed. As described under Alternative A, tidal reconnection of the Giacomini Ranch and, under this alternative, Olema Marsh would not only increase the potential for export of sources of carbon such as dissolved and particulate organic carbon, phytoplankton, seeds and other plant matter, and aquatic organisms to the bay, but for access by marine and estuarine species in search of food and refugia. In addition, watershed habitat quality would be improved by rerouting of the Tomasini Creek and its associated sediment, pathogen, and contaminant load into the East Pasture than into Tomales Bay. These benefits would complement those achieved under Alternative A from discontinuation of agricultural management practices in the Giacomini Ranch and the portion of Lagunitas Creek in the Project Area such as levee maintenance, withdrawal of water for irrigation, infrequent pumping of waters from the ranch into Lagunitas Creek, and crossing of Lagunitas Creek by cattle.

California red-legged frog: Alternative C would result in appreciable or moderate adverse impacts over the short-term to California red-legged frog breeding habitat units in the Seashore-owned and managed-portions of the Point Reyes Peninsula Core Area, as well as on distribution of red-legged frogs in the Project Area. These impacts would occur principally because of proposed activities in the Olema Marsh and the expected conversion of a large portion of the West Pasture freshwater marsh to tidal brackish marsh. However, over the long-term, impacts to California red-legged frog breeding habitat units would be reduced to minor, as freshwater marsh reestablishes within the Olema Marsh, and mitigation habitats in the East Pasture and the

Olema Creek become established. There would still be appreciable effects on distribution of the species within the Project Area, because appropriate breeding habitat would be relocated to areas not expected to be affected by salinity intrusion. Impacts during construction would be characterized as minor adverse, because excavation would be performed in the Olema Marsh.

Baseline studies documented two general areas that provide breeding habitat for red-legged frog. The largest of these is the West Pasture freshwater marsh. Breeding also has sporadically occurred in adjacent Fish Hatchery Creek, creating another 1.0 acre of breeding habitat in the West Pasture. The second breeding habitat is in the Olema Marsh and is assumed to comprise all of the areas with Freshwater Marsh and Open Water, which total 39 acres. There is no documented breeding habitat in the East Pasture, although a few adult frogs were observed during baseline surveys (Fellers and Guscio 2002).

The effects of Alternative C on red-legged frog breeding and non-breeding habitat in the East and West Pasture would be similar to Alternative B. Changes to the West Pasture freshwater marsh and non-breeding habitat with restoration would be identical to those described under Alternative B, with approximately two-thirds of the 7.2-acre marsh converted to brackish marsh with saltwater intrusion. The non-saline portion would be expanded by 0.4 acres by habitat enhancement efforts scheduled in 2006. As with Alternative B, some of the loss of breeding habitat in the West Pasture freshwater marsh would be offset by creation of the 5.4-acre Tomasini Triangle freshwater marsh in the East Pasture. There are no breeding individuals believed to be using the East Pasture currently, but low numbers of adult individuals have been sighted (Fellers and Guscio 2002). Effects on non-breeding habitat for red-legged frog in the East Pasture would still be characterized as moderate adverse due to the large-scale conversion of grassland to brackish and salt marsh, loss of drainage ditches through filling, and, under this alternative, partial realignment of Tomasini Creek and revegetation in the southern portion of the East Pasture. The latter two components would only be expected to have only short-term effects until vegetation becomes established.

The largest impact under Alternative C would come with restoration of Olema Marsh. While California red-legged frogs are known to occur in the Olema Marsh, along with bullfrogs, conditions within the area did not allow for an effective assessment of red-legged frog use. Over the short-term, the dramatic physical and water quality changes that would occur in Olema Marsh with a decrease in impoundment conditions described earlier under this alternative would have temporary adverse effects on red-legged frog breeding habitat as the system moves towards equilibrium. Extensive vegetation die-back would occur due to lowering of water surface levels, leading to larger expanses of open water. In the summer as stream flow drops, temporary drops in pH may occur, although these episodes would be expected to be relatively short-lived. Nutrient pulses and instability and dissolved oxygen conditions within marsh waters would be more persistent and would continue until the marsh began to come into equilibrium with changed conditions. The majority of these conditions would initially occur in the early fall after breeding and metamorphosis is typically complete, however, it is possible that water quality fluctuations may persist into the following breeding season.

Some of the short-term impacts to red-legged frog would be offset by creation of approximately 2 acres of freshwater ponds in the adjacent Olema Creek watershed less than 0.5 miles from Olema Marsh. The lower reaches of this watershed just above its confluence with Lagunitas Creek recently began supporting breeding red-legged frogs after the creek reestablished connectivity with its historic eastern floodplains and converted pasture to a complex marsh system with both permanently and seasonally flooded habitats. Several ponds would be created on the west side of Olema Creek several years prior to implementation of restoration in Olema Marsh to ensure that additional habitat is available. These ponds would be excavated to varying depths to provide both shallow water and deep water aquatic and emergent habitat for frogs. Ponds would be designed to remain inundated from waters received from Olema Creek flood overflow and surface runoff until late July or August using a similar construction approach to that described under Chapter 2 for the created freshwater marsh in the Tomasini Triangle (Alternative B) such as stockpiling excavated topsoil and mixing topsoil with a material such as bentonite.

Over the long-term, conditions for red-legged frogs in Olema Marsh would improve. Once the marsh has adjusted to changes in water surface levels, marsh vegetation is expected to reestablish. As described earlier, the areal extent of Tidal Brackish Marsh would increase considerably in Olema Marsh under Alternative C, because of increases in tidal influence caused by decreases in marsh impoundment conditions and possibly lowering of the Bear Valley Road culvert elevation through replacement with a bridge. Acreage of Tidal Brackish Marsh is expected to increase to between 10 and 20 acres under this alternative, depending upon the adaptive restoration components implemented, degree of marsh subsidence, and other factors (KHE 2006a). Freshwater Marsh would re-establish elsewhere in the marsh, due in large part to the continued strong permanent freshwater influence from Bear Valley Creek and the Inverness Ridge drainages and groundwater.

While water levels would not be as deep as under existing conditions, the marsh would continue to be fully inundated, with the exception of perhaps some pockets along the marsh perimeter that would be more seasonal in nature. These conditions could change somewhat in future because of sea level rise, which may increase the extent of tidal influence and Tidal Brackish Marsh habitats in the marsh.

Impacts on red-legged frog during construction would be minor adverse. In the Giacomini Ranch, construction activities would be expected to have only negligible adverse effects, because most of the heavy construction occurs in the East Pasture, and there is no breeding habitat in the East Pasture, and only a few adult frogs have been sighted. These impacts are discussed in more detail under Alternative B. With restoration of Olema Marsh, the intensity of potential impacts to breeding habitat would increase, principally because of the shallow channel excavation that would be performed in the Olema Marsh portion of Bear Valley Creek. While construction would occur outside the breeding season and critical periods for tadpoles (after July), non-breeding adults and young could still be harmed or disturbed through construction. Possible mitigation measures are discussed in a separate sub-section below.

Tidewater goby: Alternative C would have minor to moderate adverse effects on tidewater goby and tidewater goby habitat in the Project Area over the short-term, but would have major beneficial effects over the long-term through an increase in extent of potential habitat and an improvement in quality for most of the existing habitats. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take.

Within the Project Area, Acreage of existing tidewater goby habitat in the Giacomini Ranch totals 11.3 acres. This species occurs primarily in three areas within the Giacomini Ranch: Tomasini Creek, the West Pasture Old Slough and possibly Fish Hatchery Creek, and the non-tidal East Pasture Old Slough Pond. A detailed description of these areas can be found under the No Action Alternative. Numbers of tidewater goby in the Project Area have also been relatively low within each of these sites, ranging from five to 22 at most. These sites represent the only known occurrence of this species in the Tomales Bay watershed, as, prior to 2002, the species had last been sighted in the bay in 1953. Genetic analyses indicate that this population is genetically distinct from the nearest existing occurrences of tidewater goby at Salmon Creek Marsh and Rodeo Lagoon (Jacobs and Earl 2005). The effects of Alternative C on tidewater goby habitat would be very similar in most aspects to Alternative B, specifically with regards to tidal reconnection of the East Pasture Old Slough, filling of drainage ditches, and introduction of full tidal flushing to the West Pasture.

While approximately 0.3 acres of ditches in the East Pasture would be filled in as part of the elimination of agricultural infrastructure under Alternative, A, the extent of tidal channel creation would increase under Alternative C, creating approximately 11.6 acres of habitat for tidewater goby. The Park Service and CSLC would also continue with the proposed captive propagation program to expand the distribution of tidewater goby within the southern portion of the Tomales Bay watershed.

Under Alternative C, however, Tomasini Creek, the primary habitat for tidewater goby in the Project Area, would be partially realigned into one of its historic alignments. The old Tomasini Creek channel would be leveed off from the new channel in the vicinity of the Giacomini Hunt Lodge, thereby converting the old channel into more of a backwater slough feature. As with the other alternatives, existing habitat conditions would be maintained in Tomasini Creek through retention of the tidegates and associated hydrologic infrastructure. Retention of the tidegates and flashboard dam structure on Tomasini Creek, along with natural gravel bar features, create residual brackish pool habitat that provides habitat for the tidewater goby, despite the fact that the substrate and flow conditions are probably not optimal.

In some senses, realignment may improve conditions in the backwater slough portion of the old Tomasini Creek channel. Scour during high flows would be reduced considerably, with the height of the new levee designed to allow some flood overflow during larger storm events. Disconnection from the Tomasini Creek watershed would also reduce influx of nutrients and pathogens, as well as contaminants potentially being leaked from the West Marin Landfill. However, realignment of the creek would remove a major source of freshwater inflow during at least winter, spring, and early summer months. Creek flow often dries up or becomes subsurface near Mesa Road by late summer into fall. While fluvial contributions would be lost, the section of Tomasini Creek between the Giacomini Hunt Lodge and the bay also appears to receive considerable contributions of groundwater from the Point Reyes Mesa through either seep waters flowing down the face of the Mesa or from groundwater emerging at the toe of the Mesa directly into the Tomasini Creek channel. This contribution was evident during hydrodynamic modeling of the creek, because observed salinities in the creek were much lower than ones predicted on the basis of tidal and fluvial inflow. Based on modeling, salinities

near the Giacomini Hunt Lodge during the summertime with typical low summer flows should range from 20.5 to 25.0 ppt, but actual salinities recorded during monitoring by the Seashore show that salinities actually range from 15.0 to 18.0 ppt in both surface and bottom waters (KHE 2006a). Eventually, the salinity structure of the Tomasini Creek backwater slough could become more strongly influenced by tides due to sea level rise.

While these factors would suggest that conditions acceptable for tidewater goby would be maintained – and, in some ways, improved -- in the old Tomasini Creek backwater slough, the direct impacts to existing habitat do pose a risk over the short-term for tidewater goby habitat. Realignment of the Tomasini Creek channel and creation of new channels in the East Pasture would dramatically increase potential habitat in the East Pasture, but these benefits would take time to realize due to need for the habitat to establish and mature during a transitional phase following implementation. This phenomenon would not be as pronounced in the West Pasture, because there would be no new channel excavation or direct impacts to existing channel habitat other than removal of the tidegate. The tidewater goby does not currently occur in Olema Marsh, but improvements in hydraulic connectivity and expansion of brackish habitats could increase the potential for the species to establish here. For this reason, impacts to tidewater goby over the short-term are characterized as moderate adverse, with major or substantial beneficial effects expected over the long-term.

Relative to Alternatives A and B, most of the impacts to what would now be the Tomasini backwater slough from the public access component would be eliminated by removal of the through-trail component and replacement with two spur trails, one of which would extend the Tomales Bay Trail south along the old railroad grade adjacent to the slough channel.

Construction activities would directly impact existing habitats in the East Pasture and Tomasini Creek, although impacts from earthmoving to the existing Tomasini Creek would be limited in scale. Construction in the West Pasture would not directly affect tidewater goby habitat. Due to incorporation of mitigation measures, impacts during construction would be characterized as moderate adverse. Possible mitigation measures are discussed in a separate sub-section below.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: Similar to Alternative B, the effects of Alternative C on salmonid rearing and passage habitat in the Project Area would be beneficial and would generally range from moderate to major. Potential minor adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration component due to removal of the Fish Hatchery Creek tidegate, filling of the borrow ditch adjacent to the West Pasture north levee, and, under this alternative, partial realignment of Tomasini Creek and shallow excavation of Bear Valley Creek in Olema Marsh.

As discussed under the No Action Alternative, the Project Area does not represent a potential breeding or spawning area for steelhead, coho or Chinook salmon, but rather important feeding, resting, and refugia habitat for salmonids as they migrate to the ocean or move upstream to spawning grounds. Steelhead has recently been found in Fish Hatchery Creek, Tomasini Creek, the section of Lagunitas Creek in the Project Area, and in Bear Valley Creek upstream of Olema Marsh. Coho occur in Lagunitas Creek and in Tomasini Creek. Chinook has been documented in upstream portions of Lagunitas Creek, but they have not been captured as yet in the Project Area. Salmonid presence in these watersheds indicates that, while impediments, the levees and tidegate facilities are still allowing some degree of fish passage. The levees severely constrain the potential for development of off-channel or rearing habitat on Tomasini Creek and Lagunitas Creek. Fish Hatchery Creek is not leveed within the West Pasture, although it is infrequently dredged. On Bear Valley Creek, Levee Road, Bear Valley Roads, and their culverts limit both passage and rearing potential, along with the indistinct flow path in Olema Marsh created by excessive impoundment of waters.

The major benefit to salmonids under this alternative related to passage and rearing conditions would come from the considerable reduction in passage constraints associated with improvements in hydraulic connectivity of Bear Valley Creek with Lagunitas Creek and partial realignment of Tomasini Creek into an unregulated channel. In addition, these changes would also have moderate effect on the extent of rearing habitat along Bear Valley and Tomasini Creeks.

Under Alternative C, aquatic edge habitat in Giacomini Ranch would increase approximately 31 percent relative to existing conditions, with edge habitat in the Project Area climbing from approximately 15 miles under existing conditions to 19.6 miles under Alternative B. While approximately 0.3 acres of ditches would be eliminated, a total of 11.6 acres of new and restored tidal channel would be created in the East Pasture Old

Slough. The old Tomasini Creek channel would remain, functioning somewhat as a backwater slough and thereby providing additional rearing and refugia habitat for salmon. As with Alternative B, removal of the levees and Fish Hatchery Creek tidegate would improve passage potential, extent of rearing habitat, and habitat quality in the West Pasture, with 4.6 acres of tidally influenced channel expected to develop in the West Pasture.

Passage potential in Tomasini Creek and Bear Valley Creek would improve immediately following implementation of the proposed project, but benefits to areal extent of rearing habitat and habitat quality would take longer to effect, with relatively short-term transitional phases expected in both systems as they adjust and respond to changed conditions. As has been described earlier, changes during the transitional phase would be much more dramatic in Olema Marsh than in Tomasini Creek, with extensive vegetation die-back predicted in response to dramatic reductions in water surface levels. These changes would have less of an effect on salmonids than some of the other aquatic species, because the lack of hydraulic connectivity and other constraints related to infrastructure has probably considerably reduced numbers of steelhead within this system, if not eliminated passage entirely. Therefore, Bear Valley Creek and Olema Marsh are not currently perceived as either key spawning or rearing habitat for steelhead, although this subwatershed once reportedly supported at least a modest run of this fish. Because of the lower values offered during the transitional phase in both the Giacomini Ranch and Olema Marsh, short-term effects were characterized as moderate, with long-term effects anticipated to be major.

Construction would have the potential for only minor adverse impacts associated removal of the Fish Hatchery Creek tidegate, filling in of the borrow ditch, tidegate, filling of the borrow ditch adjacent to the West Pasture north levee, and, under this alternative, partial realignment of Tomasini Creek and shallow excavation of Bear Valley Creek in Olema Marsh. Construction would be scheduled to ensure that grading does not begin before July 15, which is the end of the typical period for smolt outmigration. Possible mitigation measures are discussed in a separate sub-section below.

California black rail and California clapper rail: Alternative C would have very similar major beneficial effects to Alternative B in terms of increasing habitat for California black rail and California clapper rail, with the proposed project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh. During the transitional period following construction, only negligible to minor beneficial effects would be expected, as grassland and other habitats begin the process of converting to brackish and tidal marsh, leading to temporary establishment of a more weedy, ruderal habitat that would have less benefits for rails. Similar to Alternative B, impacts during construction would be moderate adverse, because of construction actions on and near the north levee in the West Pasture and in Olema Marsh.

As discussed under the No Action Alternative, breeding populations of California black rail have primarily occur in the undiked marsh north of the Giacomini Ranch and in Olema and Bear Valley marshes in intermittent years (ARA 2002). Small numbers (1-2 individuals) also occurred within the Project Area in brackish and freshwater marsh, with possible breeding one year in the West Pasture freshwater marsh (ARA 2002). Clapper rail historically occurred in Tomales Bay, and individuals were sighted in the undiked marsh north of the Giacomini Ranch during fall and winter between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). There have been no sightings since then, however, and there are no recent breeding records either from the bay.

Under Alternative C, benefits for black rail and clapper rail from restoration of the Giacomini Ranch would be almost identical to those under Alternative B, with breeding, foraging, resting, and refugia habitat almost tripling from approximately 120 acres to more than 350 acres with restoration of the East and West Pastures. The restoration would provide benefits primarily to black rail, although clapper rail could benefit substantially, as well, from establishment of low and high Tidal Salt Marsh habitats. Increases in high marsh habitat in Giacomini Ranch could, at least temporarily, offset any decreases in this habitat in the undiked marsh habitat north of the ranch from accelerated rates of bank slumping and channel widening that might be potentially being caused by a non-native isopod. This isopod would be likely to move south into the Giacomini Ranch once tidal connection and habitats are restored. Alternative C could improve the quality of refugia habitat in the East Pasture through efforts to increase the cover of native grasses in the southern portion of the pasture. The proximity of the East and West Pastures to the existing habitat in the adjacent undiked marsh would greatly increase the likelihood for successful establishment by rails in the restored areas.

As noted above, California black rails have bred in intermittent years in Olema Marsh and Bear Valley Marsh. With lowering of water surface levels and associated changes in the mix of riparian, brackish marsh, and

freshwater marsh habitats, the suitability of these marshes for black rail would be enhanced, particularly if pockets of more seasonally flooded habitat develop on the perimeter. As with Giacomini Ranch, these minor beneficial effects would take place over the long-term, with conditions expected to be less desirable during the short-term due to the extensive die-back of vegetation and water quality problems that may occur during the transitional phase.

Construction would be expected to have potential moderate adverse effects on rails. While construction would be conducted outside of the documented breeding season for clapper rails (February through August 31), the filling of the borrow ditch and extension of the tidal channel in the undiked marsh into the West Pasture could negatively affect rails through temporary impacts to habitat and disturbance from noise. Possible mitigation measures are discussed in a separate sub-section below.

Other Special Status Species: The effects of Alternative C on other special status species would generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East and West Pasture and Olema Marsh restoration components would range from beneficial negligible to moderate adverse. Proposed mitigation measures proposed for some of these species are described in a separate sub-section below.

Species included in this category are federally or state-listed threatened and endangered species that are only occasional visitors or vagrants to the Project Area or were formerly listed as a Species of Concern by the Sacramento office of the USFWS. These species include **California freshwater shrimp**, California brown pelican, green sturgeon, Least Bell's vireo, American peregrine falcon, sandhill crane, bank swallow, **northwestern pond turtle**, **southwestern river otter**, and **saltmarsh common yellowthroat**. Impacts from implementation of this alternative would be beneficial or only have negligible to minor adverse effects from conversion in habitat type for most of these species, except northwestern pond turtle, which is characterized as having moderate adverse effects. A detailed description of effects for most of the incidental visitors to the Project Area can be found under Alternative A.

California freshwater shrimp primarily occurs considerably upstream of the Project Area on Lagunitas and Olema Creeks, although it occasionally moves downstream on Lagunitas Creek into the White House Pool reach of Lagunitas Creek. The frequency of occurrence within the Project Area probably depends to a large degree on flow and salinity conditions in this highly variable estuarine zone of the Lagunitas Creek delta. Based on results of hydrodynamic modeling, there is a potential under Alternative C for minor adverse impacts to this species from a change in salinity structure of the White House Pool reach of Lagunitas Creek due to an increase in exchange with Olema Marsh, which would store a higher volume of brackish waters relative to existing conditions (KHE 2006a). These higher salinity conditions could preclude or discourage use of habitat in this area by freshwater shrimp. In addition to project-related effects, construction could result in minor adverse impacts from levee removal, creek bank grading, and removal of riparian vegetation along the southern portion of the East Pasture, although every effort would be made to preserve as much riparian vegetation as possible.

Similar to red-legged frog, **northwestern pond turtles** would be negatively affected by conversion of grassland and freshwater marsh habitats to tidal and brackish marsh habitats in both the East and the West Pastures. Construction activities expected to have the most effect would be filling in of the drainage ditches, tidal reconnection of the East Pasture Old Slough and excavation, construction of the eastern perimeter trail along Tomasini Creek, and removal of the Fish Hatchery Creek tidegate. Following implementation, turtles may become restricted to freshwater portions of Tomasini Creek and Fish Hatchery Creek and pockets of freshwater marsh along the ranch periphery. In the East Pasture, the Tomasini Creek levee would remain, which could maintain aestivation habitat. Northwestern pond turtle has not been observed in Olema Marsh, although it does occur in Lagunitas Creek. The potential changes in salinity structure for the White House Pool reach of Lagunitas Creek could have similar adverse impacts on turtles in the creek as described in freshwater shrimp above. Improvements in hydraulic connectivity between Lagunitas Creek and Olema Marsh may increase the potential for turtles to move into the Olema and Bear Valley marshes, although the southernmost portions of Olema Marsh would probably be too saline to be appropriate habitat.

Under Alternative C, construction-related effects on **saltmarsh common yellowthroat** would be reduced from minor under Alternative B to negligible with elimination of the through-trail component of the eastern perimeter trail. Saltmarsh common yellowthroat may actually benefit from this alternative after implementation, because of the considerable reduction in direct impacts to existing habitat from public access-related components and the increase in Forested and Scrub Shrub Riparian habitat in Olema Marsh from

conversion of Freshwater Marsh with dewatering. Olema Marsh has historically supported a large breeding population of saltmarsh common yellowthroat.

Proposed Additional Mitigation Measures: Standard BMPs would be implemented to reduce impacts to special status species and wildlife habitats are discussed under Chapter 2. All construction and staging/stockpiling areas would be cleared by biologists prior to use to ensure that there are no nesting or breeding species within the vicinity of the Project Area or staging/stockpile areas prior to implementation. Measures specific to certain species are described below:

General: Impacts to aquatic organisms in construction areas such as Fish Hatchery Creek, East Pasture Old Slough Pond, and Bear Valley Creek/Olema Marsh would be minimized through dewatering affected channel areas to the extent possible and performing extensive seining to remove fish and macroinvertebrates prior to construction. Organisms would be relocated to areas outside the construction zone. In Olema Marsh, fine-mesh fencing or nets may be installed if possible on the perimeter of the channel excavation area to ensure that, once pre-construction surveys and seining have been completed, fish and other aquatic organisms do not automatically move back into the construction area. This measure may be difficult to implement due to the deep water depths unless some dewatering occurs prior to construction.

High Value Wildlife Habitats/General Wildlife Use: Implementation of restoration in Olema Marsh would have the potential for moderate adverse impacts over the short-term. Some of the impacts to general wildlife use, if not wildlife habitats, from water quality problems generated by lowering water surface levels could be potentially mitigated through extending the period of drawdown. Olema Marsh implementation would include adaptive management and monitoring. In order to reduce the potential water quality impacts associated with the reduction in water level and aquatic vegetation die off, the excavation and lowering of water level would be limited to excavation of only the fill area controlling water level.

California red-legged frog:

Construction Mitigations: Construction activities would include removal of ditches; excavation of certain portions of the East Pasture Old Slough; and shallow excavation of the portion of Bear Valley Creek in Olema Marsh. Olema Marsh is known breeding habitat for red-legged frog. Though not documented as supporting breeding habitat, the Old Slough and ditches and other areas within the East and West Pastures may provide non-breeding habitat. Construction activities adjacent to or within California red-legged frog habitat documented as breeding habitat would not be conducted until August. Pre-construction surveys would be completed in all construction areas to confirm that no red-legged frogs are present.

In Olema Marsh, fine-mesh fencing or nets may be installed if possible on the perimeter of the channel excavation area to ensure that, once pre-construction surveys and seining have been completed, fish and other aquatic organisms do not automatically move back into the construction area. This measure may be difficult to implement due to the deep water depths. Frogs encountered would be relocated.

Possible Project-Related Mitigation Measures - Olema Marsh: Proposed reductions in the Olema Marsh water level would result in reduction in static water level, which may result in large fluctuations in water quality and emergent vegetation conditions that could affect the viability of the marsh over the short-term for breeding habitat. For these reasons, several possible mitigation measures may be implemented to reduce short-term impacts to breeding habitat. One possible mitigation measure would involve construction of a creek bypass that would involve excavation of fill from the eastern edge of the marsh, with most of the material placed immediately to the west, essentially separating the flow channel from the marsh. In addition, another potential mitigation measure identified as part of the water quality section includes a more gradual approach to dewatering of Olema Marsh through limiting the excavation depths at the outflow of the Olema Marsh. Removal of vegetation along the excavated flow path and either notching or culverting the berm that currently constricts outflow would allow for a more gradual drawdown in water level that may reduce the potential water quality impacts associated with restoring the currently impounded marsh.

Tidewater goby: Construction would not occur in or directly adjacent to existing tidewater goby habitat during the typical season of reproduction for tidewater goby documented in the literature (late April – early summer; Swift 2003). Prior to construction in the East Pasture Old Slough Pond, ditches, Tomasini Creek, and Fish Hatchery Creek for removal of the tidegate, extensive seining would be performed after some dewatering to lower water levels and to increase the efficiency of trapping. Minnow traps and dip nets may also be used to

increase capture rates. Captured fish would be immediately relocated to Tomasini Creek, the West Pasture Old Slough, or other appropriate habitat.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: Work affecting Lagunitas Creek, Fish Hatchery Creek, Tomasini Creek, and Bear Valley Creek would be conducted after July 15 to minimize impacts to salmonids. BMPs identified in Chapter 2 to decrease sedimentation and impacts to wetlands would mitigate potential impacts associated with selective deconstruction of levees, regrading of creek banks, construction of the eastern perimeter trail, and installation of a pre-fabricated bridge. In addition to these BMPs, other actions would be taken to minimize impacts, including use of an excavator rather than a bulldozer to remove fill and excavation in sensitive creek areas during periods when construction area is exposed to the extent possible. During removal of the tidegate on Fish Hatchery Creek, water levels within the construction zone would be lowered, and extensive seining would be performed to remove any salmonids prior to construction. Captured fish would be relocated to appropriate upstream habitats.

California black rail and California clapper rail: The proposed project would comply with directives to not come within 250 feet of established rail habitat prior to August 31 by delaying construction in the northern portion of the East, West Pasture, and Olema Marsh until September.

California freshwater shrimp: Construction conducted in the White House Pool reach would comply with BMPs identified in Chapter 2 to decrease sedimentation and impacts to wetlands would mitigate potential impacts associated with selective deconstruction of levees, regrading of creek banks, and installation of a pre-fabricated bridge. Pre-construction surveys would be conducted, and any shrimp found would be relocated upstream outside of the construction zone.

Northwestern pond turtle: Prior to construction in the ditches, East Pasture Old Slough, and Fish Hatchery Creek, water levels would be lowered to the extent possible, and turtles would be trapped and relocated to appropriate habitat, either to Lagunitas Creek or the Martinelli Ponds in the Martinelli Ranch directly to the north of the Giacomini Ranch.

Saltmarsh common yellowthroat: Prior to construction of the southern perimeter trail or the possible future extension of the southern perimeter trail to Inverness Park, pre-construction surveys would be conducted to ensure that no active nests are present or that nesting and fledging have been completed prior to construction being conducted within or in the immediate vicinity (< 100 feet) of riparian habitat that is either known to support or believed capable of supporting common yellowthroat.

Effectiveness of Proposed Additional Mitigation Measures

High Value Wildlife Habitats/General Wildlife Use: Mitigation measures proposed would be expected to reduce the severity of short-term impacts to use by wildlife from restoration of Olema Marsh, but potential short-term impacts to High Value Wildlife habitats may be unavoidable. Over the long-term, these impacts, however, would be mitigated by adjustment to changed conditions and reestablishment of a slightly different mix of High Value Wildlife Habitats.

California red-legged frog: The potential project-related mitigation measures proposed above, in combination with the habitat creation proposed under Alternative C as described in Chapter 2, would possibly further reduce the moderate short-term and long-term impacts to California red-legged frog. Construction-related mitigation measures would keep impacts during implementation of restoration to no more than minor.

Tidewater goby: The mitigation measures would be expected to reduce impacts, but impacts cannot be eliminated. Even with extensive seining, some mortality of fish would be expected, because tidewater goby burrow in the mud, making it extremely difficult to trap all fish. Construction would, therefore, result in incidental take. The proposed mitigation measures would result in this alternative having moderate adverse impacts on tidewater goby during construction.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: The proposed mitigation measures should reduce any potential impacts to minor levels.

California black rail and California clapper rail: The proposed mitigation measures should result in no more than moderate adverse impacts on rails during construction.

California freshwater shrimp: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Northwestern pond turtle: The mitigation measures would be expected to reduce impacts, but would not eliminate them. Even with dewatering of the channels and extensive trapping, some mortality of turtles would be expected. The proposed mitigation measures would result in this alternative having moderate adverse impacts on turtles during construction.

Saltmarsh common yellowthroat: The proposed mitigation measures should reduce any potential impacts to negligible levels.

Cumulative Impacts: Based on the list of recently conducted, proposed, or reasonably foreseeable projects described under the No Action Alternative, cumulative impacts to California red-legged frog under Alternative C would not be expected to change from the impacts already characterized for the proposed project. Over the short-term, moderate adverse impacts to breeding habitat units in the Seashore-owned and managed portions of the Point Reyes Peninsula Core Area would occur from the dramatic changes in Olema Marsh and the conversion of a large portion of the West Pasture freshwater marsh to Tidal Brackish Marsh. However, these impacts would be reduced to moderate or less-than-significant levels through maturation of created habitat in the East Pasture Tomasini Triangle and the Olema Creek ponds as described under Alternatives B and/or C, as well as implementation of the project-related mitigation measures proposed above. Because many of the mitigation measures approved by USFWS for other Seashore projects involve maintenance or repair of existing ponds, these measures are expected to provide appropriate habitat value for frogs over a much shorter timeframe than those involving habitat creation such as the proposed project. Therefore, the cumulative impact of the proposed project with the projects identified under the No Action Alternative would not exacerbate the intensity of the impacts over the short-term, which are already characterized as moderate. Over the long-term, mitigation measures proposed for all the projects, including habitat creation, would reduce impacts to at least minor for the Point Reyes Peninsula Core Area.

Cumulative impact for California black rails, California clapper rails, shorebirds, and waterfowl would be expected to be very similar to those described under Alternative A.

In terms of steelhead, the proposed project would be expected to have at least minor to moderate beneficial effects on fish in Bear Valley Creek should the proposed Bear Valley Creek Watershed and Fishery Enhancement Project be conducted. Through improvement of hydraulic connectivity and a decrease in water impoundment in Olema Marsh, Alternative C would increase passage potential and off-stream refugia for steelhead in the lower reaches of Bear Valley Creek. The Bear Valley Creek project could improve passage potential in the upper reaches of Bear Valley, thereby leading to a cumulatively beneficial effect on movement of steelhead into this watershed, particularly as the anadromy of the low to moderate numbers of steelhead observed in the past is uncertain.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative C on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from major adverse to major beneficial. As with Alternative B, the East and West Pastures would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. However, under this alternative, there would also be restoration of Olema Marsh. Over the long-term, Alternative C would be expected to have major beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some minor adverse impacts during construction and moderate adverse impacts over the short-term from the dramatic changes expected in the Olema Marsh.

As with Alternative B, the largest change under this alternative relative to existing conditions would come from the substantial conversion of grassland or pasture to salt and brackish marsh. Through restoration, more than two-thirds of the East Pasture and one-third of the West Pasture would be expected to shift from grassland to tidal or brackish marsh. A transitional period would be expected over the short-term in the Giacomini Ranch during which, as pasturelands slowly convert through exposure to saline conditions to marsh, restored areas would be dominated by a mix of non-native opportunistic, moderately salt-tolerant species characteristic of brackish conditions.

Most of the gain in High Value Wildlife Habitat under Alternative C would come from restoration of Olema Marsh. The major increase in High Value Wildlife Habitats would have a moderate beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species increasing appreciably relative to existing conditions. Some of the largest changes in wildlife use under this alternative relative to Alternative A would be expected to come from increased use of expanded marsh and riparian habitats in Olema Marsh and Tomasini Creek. While restoration efforts in the East Pasture and the West Pasture would increase, general wildlife use patterns would be relatively similar to those under Alternative B, probably due to the small increase between Alternatives B and C in acreage of High Value Wildlife Habitats in the Giacomini Ranch. Elimination of the eastern perimeter through-trail component would be expected to reduce impacts on wildlife from increased visitation to negligible, with most of the impact occurring on the already moderately trafficked southern perimeter Lagunitas Creek corridor. Because of the disturbed nature of the Mesa Road spur trail area (e.g., ranch housing, heavy vehicle traffic for ranch maintenance, use of the Giacomini Hunt Lodge, and gardening operations), the impact of this public access element on wildlife use within the highly disturbed riparian corridor would be negligible, at most.

In the Olema Marsh restoration component, removal of a small berm that is limiting outflow of waters from the marsh would improve hydraulic connectivity with Lagunitas Creek. The dewatering expected with removal of the berm and possible replacement of the Levee and Bear Valley Road culverts would potentially lower water surface levels in Olema Marsh by as much as 1- to 4 feet or more. It should be noted that proposed mitigation actions to reduce impacts to the California red-legged frog would include reduction in marsh excavation to reduce potential water level drop, and effect of conditions described below. During the transitional period following implementation, considerable die-back of Freshwater Marsh vegetation would take place, leaving dead stands of tall emergents and larger expanses of open water areas subject to water quality problems. From a wildlife perspective, the short-term effects of these changes in Olema Marsh would generally range from minor to moderate adverse. Over the long-term, as brackish vegetation and freshwater marsh habitat rebounds in Olema Marsh, a recovery of freshwater marsh-associated species (e.g. marsh wrens, red-winged blackbirds, rails) would be expected, as well as an increase in riparian-associated bird species due to expansion of riparian habitat.

It should be noted that the Olema Marsh, and the ponded conditions that maintain habitat described above for the red-legged frog, also represents the barrier to steelhead and potentially salmon access to Bear Valley Creek. The physical conditions necessary to support breeding habitat of the red-legged frog are the same conditions which limit or eliminate potential salmonid access to the watershed.

Changes in the Giacomini Ranch component relative to Alternative B include partial realignment of Tomasini Creek into one of its historic alignments. The existing Tomasini Creek channel would remain, as would the tidegates and flashboard dam structure, but the old channel would be leveed off from the new one. This change would convert the old Tomasini Creek channel into more of a backwater slough that would continue to receive freshwater influence from groundwater flowing off the Point Reyes Mesa, as well as occasional overbank flooding from Tomasini Creek during large storm events. This change would be expected to increase the intensity of short-term impacts to tidewater goby through direct impacts to existing habitat, but, over the long-term, changes would be beneficial, because of the overall increase in habitat.

Alternative C would have very similar minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions as Alternatives A and B, with increases in numbers and extent of aquatic invasives expected in Olema Marsh. Tidal reconnection of the Giacomini Ranch and Olema Marsh to Lagunitas Creek would have a moderate beneficial effect in terms of support of wildlife species in southern portion of the Tomales Bay watershed. For the San Francisco Bay region in general, the proposed project, in combination with other proposed and ongoing restoration projects, would be expected to generally have a cumulatively negligible beneficial effect on regional populations of California black rails, California clapper rails, waterfowl, and shorebirds.

California red-legged frog: Alternative C would result in appreciable or moderate adverse impacts over the short-term to California red-legged frog breeding habitat units in the Seashore-owned and managed-portions of the Point Reyes Peninsula Core Area, as well as on distribution of red-legged frogs in the Project Area. These impacts would occur principally because of proposed activities in the Olema Marsh and the expected conversion of a large portion of the West Pasture freshwater marsh to tidal brackish marsh. However, over the long-term, impacts to California red-legged frog breeding habitat units would be reduced to minor, as freshwater marsh reestablishes within the Olema Marsh, and mitigation habitats in the East Pasture and the Olema Creek become established. There would still be appreciable effects on distribution of the species within the Project Area, because appropriate breeding habitat would be relocated to areas not expected to be

affected by salinity intrusion. Impacts during construction would be characterized as minor adverse, because excavation would be performed in the Olema Marsh. Because many of the mitigation measures approved by USFWS for other Seashore projects involve maintenance or repair of existing ponds, these measures are expected to provide appropriate habitat value for frogs over a much shorter timeframe than those involving habitat creation such as the proposed project. Therefore, the cumulative impact of the proposed project with the projects identified under the No Action Alternative would not exacerbate the intensity of the impacts over the short-or long-term.

Tidewater goby: Alternative C would have moderate adverse effects on tidewater goby habitat on tidewater goby in the Project Area over the short-term, but would have major beneficial effects over the long-term through after implementation through a potential increase an increase in extent of potential habitat and an improvement in quality for most in the areal extent of East and West Pasture habitat and the quality of the existing habitats in Tomasini Creek. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take of this federally listed species.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: The effects of Alternative C on salmonid rearing and passage habitat in the Project Area would be beneficial and would generally range from moderate to major. Potential minor adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration component due to removal of the Fish Hatchery Creek tidegate, and filling of the borrow ditch adjacent to the West Pasture north levee, and, under this alternative, partial realignment of Tomasini Creek and shallow excavation of Bear Valley Creek in Olema Marsh.

California black rail and California clapper rail: Alternative C would have very similar major beneficial effects to Alternative B in terms of increasing habitat for California black rail and California clapper rail, with the proposed project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh adjacent to existing rail habitat.

During the transitional period following construction, only negligible to minor beneficial effects would be expected, as grassland and other habitats begins the process of converting to brackish and tidal marsh, leading to temporary establishment of a more weedy, ruderal habitat that would have less benefits for rails. Impacts during construction would be moderate adverse, because of construction actions on and near the north levee in the West Pasture and in Olema Marsh.

Other Special Status Species: The effects of Alternative C on other special status species would generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East and West Pasture and Olema Marsh restoration components would range from beneficial negligible to moderate adverse.

Alternative D

Analysis: The effects of Alternative D on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from major adverse to major beneficial and are almost identical to Alternative C. As with Alternative C, the East and West Pastures of the Giacomini Ranch and Olema Marsh would be restored. However, public access would be scaled back with conversion of the through-trail component on the southern perimeter to an enhanced spur trail with no bridge and no possible for future extension of the trail to Inverness Park. An ADA-compliant spur trail would be constructed at White House Pool County park. The eastern perimeter trail would include only one spur trail – the extension of the Tomales Bay Trail. Some of the other major changes under Alternative D that would affect wildlife would be the complete realignment of Tomasini Creek into one of its historic alignments; excavation of higher elevation intertidal and grassland areas to lower intertidal elevations; and replacement of the Tomasini Creek Mesa Road culvert. There would also be additional tidal channel creation relative to Alternative C in the East Pasture.

Wildlife Habitats and General Wildlife Use – Project Implementation: Over the long-term, Alternative D would be expected to have major beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some moderate adverse impacts during construction in the Project Area. Under this alternative as with Alternative C, the dramatic rate of gain in High Value Wildlife Habitats between each of the alternatives would slow considerably. While Alternative B represented an almost 40 percent increase in High

Value Wildlife Habitats from Alternative A, Alternative D would only increase the acreage of High Value Wildlife Habitats relative to Alternative C by 3 percent. As with the other alternatives, the largest change under this alternative relative to existing conditions would come from the substantial conversion of grassland or pasture and freshwater marsh to salt and brackish marsh. Under Alternative D, the degree of conversion is increased through excavation of at least 9 acres of grassland to intertidal elevations. Through these actions, almost 75 percent of the Giacomini Ranch would be expected to shift from grassland to tidal or brackish marsh. Most of the gain in High Value Wildlife Habitat under Alternative D would come from increased restoration of the East Pasture.

As with Alternative C, moderate adverse impacts would occur over the short-term to High Value Wildlife habitats from the changes expected in lowering of water surface levels in Olema Marsh, though in the long-term, these conditions would stabilize, resulting in long-term major beneficial effects on High Value Habitat as natural processes are restored.. These changes are discussed in more detail under Alternative C.

The major increase in High Value Wildlife Habitats relative to existing conditions would have a moderate beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species increasing appreciably relative to existing conditions. In general, the trends in wildlife use predicted under Alternative C would continue under Alternative D for the Giacomini Ranch West Pasture and Olema Marsh. Some of the largest changes in wildlife use under this alternative relative to Alternative C would be expected to come from increased use of expanded marsh and riparian habitats in the East Pasture and Tomasini Creek. Elimination of the bridge component on the southern perimeter trail and the Mesa Road spur trail would have negligible to minor benefits, at most, for wildlife, principally because of the reduction in the small amount (<0.1 acre) of permanent and temporary riparian habitat loss and continued disturbance from bridge maintenance activities.

Creation of additional intertidal salt and brackish marsh in the East Pasture through excavation would increase habitat for waterbirds such as California black rail and California clapper rail, as well as marsh-associated passerines (e.g., marsh wren) and colonial waterbirds (e.g., herons and egrets). The excavation would increase mid-marsh areas through lowering of higher elevation intertidal areas, as well as conversion of grassland.

Complete realignment of Tomasini Creek would increase the extent of backwater slough habitat retained in the old Tomasini Creek channel, but would not necessarily change the amount of High Value Wildlife Habitats or abundance and diversity of wildlife species expected to use the creek relative to Alternative C. To ensure that realignment does not inadvertently drain the created Tomasini Triangle freshwater marsh, the creek would be shallowly bermed on either side through the marsh to retain ponded conditions. The berm would be actively revegetated with riparian vegetation to increase the value of this berm as breeding, non-breeding, and refugia habitat for wildlife. This change to the Tomasini Triangle would reduce the size of the created marsh from 5.4 acres under Alternatives B and C to 5.2 acres under Alternative D.

Replacement of the Tomasini Creek Mesa Road culvert would improve hydraulic connectivity between upstream and downstream reaches of the creek and potentially have a negligible to minor indirect effect on riparian habitat upstream of Mesa Road. Improvement of flow conditions could reduce backwater flooding upstream of Mesa Road and thereby decrease the width of the currently sizeable Forested and Scrub Shrub Riparian corridor or maintain the width of the corridor, but convert the understory from marsh vegetation to shrubs more characteristic of drier conditions. A decrease in width of the riparian corridor would have negligible to minor effects on resident and Neotropical migrant passerines associated with riparian habitat, along with other amphibian, reptile, and mammalian species. Red-legged frog and pond turtle have not been observed in this reach of Tomasini Creek, although it could provide non-breeding habitat. While the existing culvert may not have precluded passage of steelhead and coho, replacement may improve conditions for passage.

Removal of approximately 0.3 acres of eucalyptus could have some temporary effects on wildlife use, although removal would be timed to occur after completion of Pre-Construction Surveys and the end of the breeding season for avian species likely to use eucalyptus. Ultimately, these trees could be replaced by riparian species that would offer higher ecological value for wildlife.

Wildlife Habitats and General Wildlife Use – Long-Term Changes: As discussed under Alternative A for Giacomini Ranch, the brackish, tidal marsh, and riparian habitats described would eventually develop after a short-term (~ 10 years) transitional period in which grassland is converted into marsh. In addition, Olema Marsh would also respond to dramatic changes in physical conditions with a short-term transitional period in

which existing vegetation would die-back considerably and create more expanses of open water until equilibrium is reached at which point new habitats would begin to develop. Over the long-term, these habitats would possibly continue to evolve in response to sea level rise, which could lead to regular inundation of large portions of the East and West Pastures below 4 feet NAVD88 should sea level rise at the currently projected rate of 3 feet by 2100 (Overpeck et al. 2006). This change would also affect Olema Marsh, as impoundment would no longer preclude inflow from Lagunitas Creek. However, predicting the magnitude of this change is difficult given the adaptive restoration approach proposed for this component of the proposed project. In general, sea level rise would intensify the conversion of Freshwater Marsh to Tidal Brackish Marsh.

Relative to Alternative C, long-term impacts related to disturbance of wildlife by visitors would decrease somewhat, because access on the eastern perimeter trail would be reduced to just one (1) spur trail originating from the end of the Tomales Bay Trail. The southern perimeter trail would also be converted from a through-trail to an enhanced spur trail, although there is a possibility in the future that a bridge could be built at the location of the old summer dam through a separate environmental compliance process should other southern perimeter access options not prove viable. Elimination of the bridge from project-level consideration would somewhat reduce impacts to wildlife from disturbance by visitors, primarily by decreasing numbers of users and eliminating intrusions directly in the stream corridor. However, this area already receives a considerable amount of disturbance from users of the existing informal path, Giacomini Ranch maintenance, users of the Green Bridge and White House Pool County parks, and residents along Levee Road. With restoration of the wetlands and construction of the ADA-compliant trail and viewing platform at White House Pool County park, these disturbances would be expected to increase slightly, resulting in negligible adverse impacts to wildlife use. In addition, the Tomales Bay spur trail would not be expected to have more than very negligible adverse impacts on wildlife use, because it would end north of the start of the riparian corridor along Tomasini Creek and the Point Reyes Mesa Bluff and would be at some distance from the shallow shorebird area.

Wildlife Habitats and General Wildlife Use – Construction: Construction of Alternative D would generally have minor adverse effects on High Value Wildlife Habitats and use by common wildlife species. Special status species are discussed individually. Pre-construction surveys would be conducted as described under Alternative A.

Eleven of the proposed construction activities would have the highest potential to affect both common and special status wildlife species. These activities are regrading of the southern levee in the East Pasture and creek bank to a more stable profile; filling of drainage ditches; tidal reconnection of the East Pasture Old Slough Pond; removal and breaching of levees; removal of the Fish Hatchery Creek tidegate; filling of the borrow ditch in the undiked marsh north of the West Pasture; Tomasini Creek realignment; shallow excavation of Bear Valley Creek; and possible replacement of the Levee Road, Bear Valley, and Mesa Road culverts. Potential impacts to wildlife from most of these construction activities are discussed under Alternatives A, B, and C. As described in Chapter 2, standard BMPs would be employed to minimize sediment discharge, and efforts would be made to preserve larger willows and other riparian trees during regrading of the creek bank.

Under Alternative D, Tomasini Creek would be completely realigned, and the culvert on Mesa Road would be replaced. These construction activities have the potential to negatively affect aquatic organisms such as fish (e.g., salmonids) and potentially macroinvertebrates, as well as amphibians and reptiles. Non-resident species such as waterfowl, waterbirds, southwestern river otter, and rails would not be impacted unless nesting or breeding was occurring.

Based on the scale and timing of construction activities that could affect High Value Wildlife Habitats and use by common wildlife species, the impacts of construction are characterized as minor to moderate adverse. The intensity of construction impacts on special status species is addressed separately below.

Invasive Wildlife Species: Alternative D would have very similar minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions as Alternatives A and B, with increases in numbers and extent of aquatic invasives expected in Olema Marsh.

Wildlife Conditions in the Watershed: Tidal reconnection of the Giacomini Ranch and Olema Marsh to Lagunitas Creek would have moderate beneficial effect in terms of support of wildlife species in southern portion of the Tomales Bay watershed. As described under Alternative A, tidal reconnection of the Giacomini Ranch and, under this alternative, Olema Marsh would not only increase the potential for export of sources of carbon such as dissolved and particulate organic carbon, phytoplankton, seeds and other plant matter, and

aquatic organisms to the bay, but for access by marine and estuarine species in search of food and refugia. In addition, watershed habitat quality would be improved by rerouting of the Tomasini Creek and its associated sediment, pathogen, and contaminant load into the East Pasture than into Tomales Bay. These benefits would complement those achieved under Alternative A from discontinuation of agricultural management practices in the Giacomini Ranch and the portion of Lagunitas Creek in the Project Area such as levee maintenance, withdrawal of water for irrigation, infrequent pumping of waters from the ranch into Lagunitas Creek, and crossing of Lagunitas Creek by cattle.

California red-legged frog: Alternative D would have almost identical effects to Alternative C on California red-legged frog despite the complete realignment of Tomasini Creek. Over the short-term, Alternative C would have moderate adverse impacts on California red-legged frog breeding habitat units in the Point Reyes Peninsula Core Area and distribution of red-legged frogs in the Project Area, principally because of restoration of Olema Marsh and the conversion of the West Pasture freshwater marsh to brackish marsh. These effects would be offset through creation of the 5.2-acre Tomasini Triangle freshwater marsh and approximately 2 acres of freshwater marsh ponds in the adjacent Olema Creek watershed less than 0.5 miles from Olema Marsh, the latter of which would be constructed prior to restoration of Olema Marsh. Over the long-term, impacts to habitat units within the region would be reduced to minor through full establishment of the Tomasini Triangle freshwater marsh and reestablishment of freshwater marsh in Olema Marsh. However, as with Alternative C, this alternative would still be expected to have an appreciable or moderate effect over the long-term on distribution of frogs in the Project Area. Impacts during construction would be characterized as minor adverse, because excavation would be performed in Olema Marsh.

Project- and construction-related effects of Alternative D are almost identical to Alternative C and are described in more detail under Alternative C. While Tomasini Creek would be completely rerouted through the created Tomasini Triangle freshwater marsh, thereby reducing the marsh size by 0.2 acres relative to Alternative C, the low berms proposed to run along both sides of the rerouted creek in the marsh to ensure that ponding is retained would be expected to minimize adverse impacts from this change. In addition, low berms would be actively revegetated with riparian vegetation, thereby increasing their value as breeding, non-breeding, and refugia habitat for wildlife, including red-legged frog and northwestern pond turtle. Low berms would be designed to allow some flood overflow into the two marsh "cells" during large storm events to increase fluvial contributions to the marsh.

Tidewater goby: Alternative D would have almost identical effects to Alternative C on tidewater goby despite complete realignment of Tomasini Creek. While this alternative would have minor to moderate adverse effects on tidewater goby habitat in the Project Area over the short-term, it would have major beneficial effects over the long-term through an increase in extent of potential habitat and an improvement in quality for most of the existing habitats. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take.

Project- and construction-related effects of Alternative D are almost identical to Alternative C and are described in more detail under Alternative C. While Tomasini Creek would be completely rerouted through the created Tomasini Triangle freshwater marsh under this alternative, the effects on tidewater goby would be considered similar. One slight change in effect is that the size of the backwater slough habitat feature created in the old Tomasini Creek channel would be enlarged relative to Alternative B by moving the rerouting point for Tomasini Creek further upstream. This change would be expected to have only negligible beneficial effects ultimately on tidewater goby relative to Alternative C. Also, additional tidal channel creation in the East Pasture could also increase habitat.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: Similar to Alternative C, the effects of Alternative D on salmonid rearing and passage habitat in the Project Area would be beneficial and would generally range from moderate to major. Potential minor adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration component due to removal of the Fish Hatchery Creek tidegate, filling of the borrow ditch adjacent to the West Pasture north levee, shallow excavation of Bear Valley Creek in Olema Marsh, complete realignment of Tomasini Creek, and replacement of the Tomasini Creek Mesa Road culverts.

Project- and construction-related effects of Alternative D are almost identical to Alternative C and are described in more detail under Alternative C. While Tomasini Creek would be completely rerouted through the created Tomasini Triangle freshwater marsh under this alternative, the effects on salmonids would be very

similar. Replacement of the Tomasini Creek Mesa Road culvert could slightly improve passage conditions for steelhead and coho. Additional tidal channel creation in the East Pasture could also increase rearing habitat.

California black rail and California clapper rail: Alternative C would have very similar major beneficial effects to Alternative B in terms of increasing habitat for California black rail and California clapper rail, with the proposed project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh. During the transitional period following construction, only negligible to minor beneficial effects would be expected. Impacts during construction would be moderate adverse, because of construction actions on and near the north levee in the West Pasture and in Olema Marsh.

The primary change to California black rail and California clapper rail under Alternative D would come from the slight increase in habitat relative to Alternative C from excavation of higher elevation intertidal and grassland areas to lower intertidal elevations. This increase and shift in intertidal habitats would be expected to have beneficial effects on rails.

Other Special Status Species: The effects of Alternative D on other special status species would be identical to Alternative C and generally range from minor beneficial effects to moderate adverse effects depending on the species. Impacts during construction of the East and West Pasture and Olema Marsh restoration components would range from beneficial negligible to moderate adverse.

Proposed Additional Mitigation Measures: Standard BMPs would be implemented to reduce impacts to special status species and wildlife habitats are discussed under Chapter 2. Measures specific to certain species are described below:

General: Mitigation measures would be the same as described under Alternative C.

California red-legged frog: Mitigation measures would be the same as described under Alternative C.

Tidewater goby: Mitigation measures would be the same as described under Alternative C.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: Mitigation measures would be the same as described under Alternative C.

California black rail and California clapper rail: *Mitigation measures would be the same as described under Alternative C.*

California freshwater shrimp: Mitigation measures would be the same as described under Alternative C.

Northwestern pond turtle: Mitigation measures would be the same as described under Alternative C.

Saltmarsh common yellowthroat: Mitigation measures would be the same as described under Alternative C.

Effectiveness of Proposed Additional Mitigation Measures

California red-legged frog: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

Tidewater goby: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

Central California coast steelhead, coastal California ESU Chinook salmon, and central California coast coho ESU salmon: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

California black rail and California clapper rail: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

California freshwater shrimp: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

Northwestern pond turtle: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

Saltmarsh common yellowthroat: The effectiveness of proposed mitigation measures would be the same as described under Alternative C.

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative C.

Impairment Analysis: This alternative would not impair a resource identified in the Organic Act or as a goal in Park Service management policies or considered as necessary to fulfillment of purposes identified in enabling legislation or key to the natural or cultural integrity of the park.

Conclusions: The effects of Alternative D on wildlife habitat and use in the Project Area and support of wildlife species in the watershed would generally range from major adverse to major beneficial and are almost identical to Alternative C. As with Alternative C, the East and West Pastures of the Giacomini Ranch and Olema Marsh would be restored. However, public access would be scaled back with conversion of the through-trail component on the southern perimeter to an enhanced spur trail with no bridge and no possible for future extension of the trail to Inverness Park. The eastern perimeter trail would include only one spur trail – the extension of the Tomales Bay Trail. Some of the other major changes under Alternative D that would affect wildlife would be the complete realignment of Tomasini Creek into one of its historic alignments; excavation of higher elevation intertidal and grassland areas to lower intertidal elevations; and replacement of the Tomasini Creek Mesa Road culvert.

Over the long-term, Alternative D would be expected to have major beneficial effects on High Value Wildlife Habitats in the Project Area, although there may be some minor adverse impacts during construction in the Project Area. Under this alternative as with Alternative C, the dramatic rate of gain in High Value Wildlife Habitats between each of the alternatives would slow considerably. As with the other alternatives, the largest change under this alternative relative to existing conditions would come from the substantial conversion of grassland or pasture to salt and brackish marsh. Under Alternative D, the degree of conversion is increased through excavation of at least 9 acres of grassland to intertidal elevations. Through these actions, almost 75 percent of the Giacomini Ranch would be expected to shift from grassland to tidal or brackish marsh

Most of the gain in High Value Wildlife Habitat under Alternative D would come from increased restoration of the East Pasture. The major increase in High Value Wildlife Habitats relative to existing conditions would have a moderate beneficial effect over the long-term on use of the Project Area by wildlife, with use by common and special status wildlife species increasing appreciably relative to existing conditions. In general, the trends in wildlife use predicted under Alternative C would continue under Alternative D for the Giacomini Ranch West Pasture and Olema Marsh. Some of the largest changes in wildlife use under this alternative relative to Alternative C would be expected to come from increased use of expanded marsh and riparian habitats in the East Pasture and Tomasini Creek. Construction of Alternative D would generally have minor to moderate adverse effects on High Value Wildlife Habitats and use by common wildlife species.

Creation of additional intertidal salt and brackish marsh in the East Pasture through excavation would increase habitat for waterbirds such as California black rail and California clapper rail, as well as marsh-associated passerines (e.g., marsh wren) and colonial waterbirds (e.g., herons and egrets). Complete realignment of Tomasini Creek would increase the extent of backwater slough habitat retained in the old Tomasini Creek channel, but would not necessarily change the amount of High Value Wildlife Habitats or abundance and diversity of wildlife species expected to use the creek relative to Alternative C. To ensure that realignment does not inadvertently drain the created Tomasini Triangle freshwater marsh, the creek would be shallowly bermed on either side through the marsh to retain ponded conditions. Replacement of the Tomasini Creek Mesa Road culvert would improve hydraulic connectivity between upstream and downstream reaches of the creek and potentially have a negligible to minor indirect effect on riparian habitat upstream of Mesa Road.

Alternative D would have very similar minor adverse effect on the number of non-native invasive wildlife species that would be present as a result of changes in conditions as Alternatives A and B, with increases in numbers and extent of aquatic invasives expected in Olema Marsh.

Tidal reconnection of the Giacomini Ranch and Olema Marsh to Lagunitas Creek would have moderate beneficial effect in terms of support of wildlife species in southern portion of the Tomales Bay watershed. For

the San Francisco Bay region in general, the proposed project, in combination with other proposed and ongoing restoration projects, would be expected to generally have a cumulatively negligible beneficial effect on regional populations of California black rails, California clapper rails, waterfowl, and shorebirds.

California red-legged frog: Alternative D would have almost identical effects to Alternative C on California red-legged frog despite the complete realignment of Tomasini Creek. Rerouting of Tomasini Creek through the Tomasini Triangle would only reduce the size of the Tomasini Triangle freshwater marsh by 0.2 acres, and the marsh would be prevented from draining into the creek through construction of berms on either side of the creek that would be revegetated with riparian vegetation. Impacts during construction would be characterized as minor adverse, because excavation would be performed in Olema Marsh.

Tidewater goby: Alternative D would have almost identical effects to Alternative C on tidewater goby despite complete realignment of Tomasini Creek. While this alternative would have minor to moderate adverse effects on tidewater goby habitat in the Project Area over the short-term, it would have major beneficial effects over the long-term through an increase in extent of potential habitat and an improvement in quality for most of the existing habitats. Impacts during construction would be expected to be moderate, with implementation of mitigation measures designed to reduce the potential or amount of incidental take.

Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon: Similar to Alternative C, the effects of Alternative D on salmonid rearing and passage habitat in the Project Area would be beneficial and would generally range from moderate to major. Potential minor adverse impacts to salmonid habitat or salmonids would be expected to occur during construction of the wetland restoration component.

California black rail and California clapper rail: Alternative C would have very similar major beneficial effects to Alternative B in terms of increasing habitat for California black rail and California clapper rail, with the proposed project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh. During the transitional period following construction, only negligible to minor beneficial effects would be expected. Impacts during construction would be moderate adverse, because of construction actions on and near the north levee in the West Pasture and in Olema Marsh. The primary change to California black rail and California clapper rail under Alternative D would come from the slight increase in habitat relative to Alternative C from excavation of higher elevation intertidal and grassland areas to lower intertidal elevations. This increase and shift in intertidal habitats would be expected to have beneficial effects on rails.

Other Special Status Species: The effects of Alternative D on other special status species would be identical to Alternative C and generally range from minor beneficial effects to moderate adverse effects depending on the species.

Cultural Resources

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Since the early 1900s, a number of laws and policies have been enacted to protect cultural resources, including the Antiquities Act of 1906 (16 USC §432), the Archeological Resources Protection Act of 1979 (16 USC §470aa et seq.), and the National Historic Preservation Act of 1966, as amended (NHPA; 16 USC §470 et seq.). In addition to federal and state laws governing protection of cultural resources, Executive Order 11593 instructs all federal agencies to support the preservation of cultural properties. The Park Service incorporated direction from law and federal policy into development of the Cultural Resources Management Guidelines (NPS 1998), which recognizes five types of cultural resources: archeological resources, historic structures, ethnographic resources, cultural landscapes, and museum objects.

The California Office of Historic Preservation is responsible for oversight of the NHPA in California. The Office of Historic Preservation also is responsible for oversight of California Pubic Resources Codes Section 21083.2-21084.1, which state and local agencies to evaluate impacts of proposed projects to archaeological and historic structure resources. Federal and federally-sponsored programs and projects are reviewed pursuant to Sections 106 and 110 of the NHPA. Section 106 of the NHPA requires federal agencies to consider the effects of proposed federal undertakings on historic properties. NHPA requires federal agencies to initiate consultation with the State Historic Preservation Officer (SHPO) as part of the Section 106 review process. The State Office of Historic Preservation maintains the California Register of Historic Places. The California

Register includes resources listed in or formally determined eligible for listing in the National Register of Historic Places, as well as some California State Landmarks and Points of Historical Interest. Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the California Register and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC Section 5024.1, 14 CCR § 4850). The California Register is an authoritative guide to the state's historical resources and to which properties are considered significant for purposes of CEQA.

DOI has included the presence of historic or cultural resources and/or on properties listed or eligible for listing on the National Register of Historic Places and potential for impacts to them in its criteria for determining potential significance under NEPA for the purposes of determining whether an EIS should be prepared. Under CEQA, significant effects on cultural resources would be considered to occur if the proposed project causes a substantial adverse change in the significance of a historical or archaeological resource; directly or indirectly destroys a unique paleontological resource or site; or disturb any human remains, including those interred outside of formal cemeteries. Mandatory findings of significance under CEQA are triggered by elimination of important examples of the major period of California history and prehistory. CEQA guidelines for Marin and the Community Plan also examine the potential for the proposed project to cause a physical change that would adversely affect unique ethnic cultural values or religious or sacred sites within the Project Area.

General Assumptions and Methodologies:

- Cultural resource and historic structure surveys conducted as part of baseline studies found no potentially significant archaeological resources or historic structures, although some cultural landscape features were identified.
- The proposed project has the potential to affect cultural landscape features and other possible culture resources that have not yet been discovered through removal of agricultural and hydrologic management infrastructure and restoration of natural tidal and freshwater hydrologic processes. Because no other non-landscape cultural resources have been discovered in surveys conducted to date, this analysis is restricted to cultural landscapes only.
    - While construction could have the potential to uncover previously undiscovered paleontological, archaeological, or historic resources, for the purposes of this evaluation, only the potential for impacts to known resources are assessed.
    - Evaluation takes into consideration compliance with standard BMPs that would require cultural resources specialist or tribal representative to be on-call during construction and, should resources be found, halting of construction until proper action can be taken.
- Intensity of impacts is evaluated with respect to their effects within the context of a cultural landscape. The proposed actions are evaluated at the cultural landscape scale (Table 76).

TABLE 76. CULTURAL RESOURCES -- CULTURAL LANDSCAPES

Source: Antiquities Act, ARPA, NHPA, SHPO, Park Service Management Policies, CCC/LCP Zone II, Marin CWP, Community Plan **Nature**: Beneficial, Adverse **Context**: Project Area **Duration**: Construction, Short-Term/Long-Term	
No Impact	There would be no potential for impact to cultural landscape features or other cultural resources associated with the proposed project.
Negligible	The proposed project would have **barely detectable effects** (i.e., no effect on integrity, and value and significance not compromised) on recorded features that are **part of, but not integral to**, the park's 12 cultural landscapes or that are listed in, nominated for, or proposed for nomination to the National or California Register of Historic Places; ***OR*** would have a **measurable effect** (i.e., some effect on integrity, but value and significance not compromised) on recorded features, but features are **NOT part of** the Seashore's 12 cultural landscapes and are not being listed, nominated for, or proposed for nomination to the National or California Register of Historic Places.

TABLE 76. CULTURAL RESOURCES -- CULTURAL LANDSCAPES

Minor	The proposed project would have **barely detectable effects** (i.e., no effect on integrity, value, or significance) on recorded features that are **integral to** the park's 12 cultural landscapes or that are listed, nominated for, or proposed for nomination to the National or California Register of Historic Places; ***OR*** would have **measurable effects** (i.e., some effect on integrity, but value and significance not compromised) on recorded features that are **part of, but not integral to**, the Seashore's 12 cultural landscapes or that are listed, nominated for, or proposed for nomination to the National or California Register of Historic Places; ***OR*** would have **appreciable or striking effects** (i.e., moderate to major effects on integrity that affect value and significance) on recorded features, but features are **NOT part of** the Seashore's 12 cultural landscapes and are not listed, nominated for, or proposed for nomination to the National or California Register of Historic Places.
Moderate	The proposed project would have **measurable effects** (i.e., some effect on integrity, but value and significance not compromised) on recorded features that are **integral to** the park's 12 cultural landscapes or that are listed, nominated for, or proposed for nomination to the National or California Register of Historic Places; ***OR*** would have **appreciable effects** (i.e., moderate effects on integrity that affect value and significance) on recorded features that are **part of, but not integral to**, the Seashore's 12 cultural landscapes or that are listed, nominated for, or proposed for nomination to the National or California Register of Historic Places.
Major or Substantial	The proposed project would have **appreciable effects** (i.e., moderate effects on integrity that affect value and significance) on recorded features that are **integral to** the park's 12 cultural landscapes or that are listed, nominated for, or proposed for nomination to the National or California Register of Historic Places; ***OR*** would have **substantial or major effects** (i.e., major effects on integrity that have appreciable effects on value and significance) on recorded features that are **part of, but not integral to**, the Seashore's 12 cultural landscapes or that are listed, nominated for, or proposed for nomination to the National or California Register of Historic Places.

Impact Analysis

TABLE 77. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR CULTURAL RESOURCES
All impacts would be considered Project Area and are considered Short-Term/Long-Term, unless otherwise specified.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Cultural Resources – Cultural Landscapes	No Impact	Adverse - Minor	Adverse - Minor	Adverse - Minor	Adverse - Minor

No Action Alternative

Analysis: The No Action Alternative would have no impact on known cultural resource landscape features identified in the Project Area (Table 77). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities.

Surveys of the Giacomini Ranch in 2002 identified two previously unrecorded cultural landscape features: a portion of the North Pacific Coast Railroad grade (ASC-69/01-01) and a historic-period levee system and dam (ASC-69/01-02; Newland 2003). The dam was a temporary gravel dam that the Giacominis installed each summer to provide freshwater for irrigation purposes. The Giacominis stopped summer dam installation in 1998 prior to selling the property to the Park Service. While the original levee system was constructed more than 50 years ago, the degree of alteration to this system due to repairs and reinforcement (e.g., rip-rap) reduces its value as a historic resource (Mark Rudo, Park Service, *pers. comm*.). The study determined that neither resource was eligible for listing on the National Register of Historic Places (Newland 2003). In 2004, four additional landscape features were recorded by Garcia and Associates (2004): two manure lagoons and

two corrals in the main complex. The corrals are not on Park Service property. None of these features was considered eligible for National Register of Historic Places listing (Garcia and Associates 2004).

Under the No Action Alternative, none of these landscape features would be impacted. This alternative would have no impact on historic properties. It is considered unlikely that the negligible amount of construction that would occur as part of the mitigation/restoration component would unearth other potentially significant archaeological or historic features, although the likelihood is considered extremely low. Construction BMPs would be instituted to ensure that any finds that occur during construction are handled properly.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There would be no potential for cumulative effects with other projects, because the No Action Alternative would have no impact.

Impairment Analysis: The No Action Alternative would not result in impairment to park cultural resources.

Conclusions: The No Action alternative would have no impact on known cultural resources or cultural landscape features or historic properties, as there would be no large-scale restoration, demolition of agricultural infrastructure, or construction of public access facilities.

Alternative A

Analysis: Alternative A would have a minor adverse effect on cultural resource landscape features identified in the Project Area (Table 77). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of dairy infrastructure such as barn removal, filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

As discussed under the No Action Alternative, surveys of the Giacomini Ranch in 2002 identified two previously unrecorded cultural landscape features: a portion of the North Pacific Coast Railroad grade (ASC-69/01-01) and a historic-period levee system and dam (ASC-69/01-02; Newland 2003). The dam is no longer in existence, although the pump housing remains. While the original levee system was constructed more than 50 years ago, the degree of alteration to this system due to repairs and reinforcement (e.g., rip-rap) reduces its value as a historic resource (Mark Rudo, Park Service, *pers. comm*.). The study determined that neither resource was eligible for listing on the National Register of Historic Places (Newland 2003). In 2004, four additional landscape features were recorded by Garcia and Associates (2004): two manure lagoons and two corrals in the main complex. The corrals are not on Park Service property. None of these features was considered eligible for National Register of Historic Places listing (Garcia and Associates 2004). None of the buildings on the property were considered to have cultural significance. Therefore, this alternative would have no impact on historic properties.

Under Alternative A, the two manure lagoons would be filled and regraded to blend with surrounding topography. This area would serve as a Viewing Area, with interpretative exhibits and other simple visitor facilities. An eastern perimeter trail would be constructed on the historic railroad bed using a combination of minor grading and placement of fill and culverts on a 3,200- linear-foot section that has problems with drainage from adjacent hillside and toeslope seeps. These actions would have striking effects on the integrity, significance, and value of these recorded features, but as the features are not part of or integral to the park's 12 cultural landscapes or considered eligible for listing to the National or California Register of Historic Places, these effects are considered adverse, but minor. There is a possibility that some of the earthwork that occurs in the East Pasture during construction would unearth other potentially significant archaeological or historic

features, but the likelihood is considered relatively low. Construction BMPs would be instituted to ensure that any finds that occur during construction are handled properly.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There is potentially one project that would have cumulative effects should Alternative A be implemented. The Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Commercial-Residential (CRAB-2), with a minimum 10,000 square-foot-lot. It is unlikely that possible future development along C Street would have more than a cumulatively minor impact on cultural resources under Alternative A.

Impairment Analysis: Alternative A would not result in impairment to park cultural resources.

Conclusions: Alternative A would have minor adverse impacts on known, recorded landscape features through filling and regrading of manure lagoons and construction of a culverted berm trail on the historic railroad bed. However, this alternative would have no impact on historic properties.

Alternative B

Analysis: Alternative B would have very similar minor adverse effects on recorded cultural resource landscape features identified in the Project Area as Alternative A (Table 77), although, under this alternative, the culverted berm trail on the historic railroad bed would be replaced with a low-elevation boardwalk trail that would have slightly less impact on this cultural landscape feature (Table 77). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. The whole southern East Pasture creek bank would be restored through removal of rip-rap bank stabilization and regraded, where needed, to a more stabile profile. As with Alternative A, this alternative would involve removal or restoration of dairy infrastructure and discontinuation of agricultural management practices.

With this and other alternatives, there is a possibility that some of the earthwork that occurs in the East and West Pastures during construction would unearth other potentially significant archaeological or historic features, but the likelihood is considered relatively low. Construction BMPs would be instituted to ensure that any finds that occur during construction are handled properly.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Impairment Analysis: Alternative B would not result in impairment to park cultural resources.

Conclusions: Alternative B would have very similar minor adverse effects on recorded cultural resource landscape features identified in the Project Area as Alternative A, although, under this alternative, the culverted berm trail on the historic railroad bed would be replaced with a low-elevation boardwalk trail that would have slightly less impact on this cultural landscape feature. This alternative would have no impact on historic properties.

Alternative C

Analysis: Alternative C would have very similar minor adverse effects on recorded cultural resource landscape features identified in the Project Area as Alternative B (Table 77). However, under this alternative, there would be no through trail on the historic railroad bed, but rather two spur trails that would only require minor clearing and grading and negligible amounts of fill, if any. Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of dairy infrastructure and discontinuation of agricultural management practices.

No archaeological or historic structures have been identified in or near Olema Marsh, although there is one recorded archaeological site, CA-MRN-378, to the west of Bear Valley Creek upstream of Bear Valley Road (Rudo 2006). This alternative would be unlikely to impact this recorded feature, either directly or indirectly. As with the other alternatives, there is a possibility that some of the earthwork that occurs in the East and West Pastures and Olema Marsh during construction would unearth other potentially significant archaeological or historic features, but the likelihood is considered relatively low. Construction BMPs would be instituted to ensure that any finds that occur during construction are handled properly.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Impairment Analysis: Alternative C would not result in impairment to park cultural resources.

Conclusions: Alternative C would have very similar minor adverse effects on recorded cultural resource landscape features identified in the Project Area as Alternative B, although, under this alternative, a through trail would not be constructed on the historic railroad bed. The two spur trails proposed would involve only minor clearing and grading and possibly negligible fill. This alternative would have no impact on historic properties.

Alternative D

Analysis: Alternative D would have very similar minor adverse effects on recorded cultural resource landscape features identified in the Project Area as Alternative C (Table 77). However, under this alternative, there would be only one spur trail on the historic railroad bed that would only require minor clearing and grading. Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all of the differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to intertidal elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and further scaling back of new public access facilities through elimination of the bridge across Lagunitas Creek and one of the spur trails on the eastern perimeter. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

As discussed under Alternative C, no archaeological or historic structures have been identified in or near Olema Marsh, although there is one recorded archaeological site, CA-MRN-378, to the west of Bear Valley Creek upstream of Bear Valley Road (Rudo 2006). This alternative would be unlikely to impact this recorded feature, either directly or indirectly. As with the other alternatives, there is a possibility that some of the earthwork that occurs in the East and West Pastures and Olema Marsh during construction would unearth other potentially significant archaeological or historic features, but the likelihood is considered relatively low.

Construction BMPs would be instituted to ensure that any finds that occur during construction are handled properly.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Impairment Analysis: Alternative D would not result in impairment to park cultural resources.

Conclusions: Alternative D would have very similar minor adverse effects on recorded cultural resource landscape features identified in the Project Area as Alternative C, although, under this alternative, only one spur trail would be constructed on the historic railroad bed through minor clearing and grading. This alternative would have no impact on historic properties.

Public Health and Safety – Flooding

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Federal and local regulations have been promulgated to reduce both the exposure of communities and parks to damaging flooding and the funds required to rebuild communities and parks following such major floods (Clearwater Hydrology and Nichols-Berman 2002). The National Flood Insurance Act of 1968 and the Flood Disaster Prevention Act of 1973 established the National Flood Insurance Program (NFIP) which is administered by the Federal Emergency Management Agency (FEMA; Clearwater Hydrology and Nichols Berman 2002). The NFIP provides insurance coverage to property owners within flood hazard areas that are delineated on published Flood Insurance Rate Maps (FIRMs) for both the 100-year and 500-year flood events (Clearwater Hydrology and Nichols-Berman 2002). In order to quality for the program, candidate municipalities and unincorporated county areas must adopt local floodplain development policies and enforce flood control measures for new construction and redevelopment projects within their jurisdictions (Clearwater Hydrology and Nichols-Berman 2002).

The Park Service specifically addresses flooding in its 2006 Management Policies, which are consistent with Executive Order 11988 and Directors Order 77-2. Parks are directed to "minimize potentially hazardous conditions associated with flooding" (NPS 2006; Section 4.6.4). Furthermore, parks should "avoid direct and indirect support of floodplain development and actions that could … increase flood risk" (NPS 2006, Section 4.6.4). When development must occur within a floodplain, non-structural measures should be used to reduce hazards to human life and property, while minimizing impacts to the natural resources of floodplains (NPS 2006; Section 4.6.4). Development must also be consistent with the standards and criteria of the NFIP (NPS 2006; Section 4.6.4). County policies and policies of LCP Zone II requires that new development not create a flood hazard, and the Coastal Resources Management Plant stipulates that projects should "minimize risks to life and property in areas of high geologic, flood, and fire hazard" (Section 30253).

The emphasis on public health and safety is reiterated under significance criteria developed by the DOI for NEPA and by the state for CEQA. Under NEPA, potentially significant impacts on public health and safety trigger the need to prepare an EIS. CEQA characterizes projects that place structures that would impede or redirect flood flows in 100-year flood hazard areas or that would expose people or structures to a significant risk of loss, injury or death involving flooding as having significant impacts. County CEQA guidelines focus on exposure of people or property to water-related hazards such as flooding without requiring that exposure creates a significant risk of loss, injury, or death.

General Assumptions and Methodologies

- Based on the Marin CWP, the Project Area falls within the 100-year flood hazard zone (Clearwater Hydrology and Nichols-Berman 2002).
- Hydrologic modeling shows that the existing levees control and constrain water level and process in association with 2-12 year flooding events. During larger scale events, the levees are predicted to

overtop in many areas, and would play a very small role in controlling flooding conditions and water levels.
- The proposed project has the potential to affect flood risk to adjacent homes, properties, and roads through removal/replacement of agriculture and hydrologic management infrastructure and restoration of tidal and freshwater hydrologic processes. Specific actions that have the potential to affect flooding include removal or breaching of levees, excavation, construction of berms and bridges, and changes in sediment transport processes within the Project Area that affect net aggradation or erosion of the creek channel bottoms.
- In keeping with Park Service Management Policies, the project proponents identified flood risk and not elevating flood risk above currently existing levels as one of the project's primary constraints.

Public Health and Safety – Flooding: For this document, the intensity of impacts related to flood hazards associated with the proposed project will be analyzed by assessing increases in flood risk to homes, properties, and roads. As NEPA, CEQA, and local ordinances focus on increases in risks to public safety, analysis will target actions that increase flooding of homes, garages, driveways, and public roads such that flooding of these areas could **increase** the risk of injury or **increase** the risk that homeowners could not leave to access emergency services or that emergency services such as ambulances or paramedics could not access the property or properties. Because adjacent properties and roads already flood frequently, impact thresholds will be based on **changes** in flooding that could pose risks to public safety, not just the presence or absence of flooding. Changes in flooding will be evaluated using changes in vertical flood height (feet).

Impact thresholds are based on potential increases in vertical flood elevation that could pose negligible to major or substantial risks to public health and safety (Table 78). Changes in vertical flood elevation will be assessed using results of computer hydraulic modeling (KHE 2006a) and topographic information (USGS 2003b). Changes in vertical flood elevation and risk to public health and safety will be assessed using the threshold criteria outlined below for three general areas (Figure 41):

1) East Levee Road and properties and homes along Levee Road;
2) West Levee Road adjacent to White House Pool County Park and Olema Marsh, and
3) Sir Francis Drake Boulevard in Inverness Park and properties and homes on the east side of the road contiguous with the Giacomini Ranch West Pasture.

Based on information provided by County public works, roads are assumed for analysis purposes to be closed to the public when there is ≥ 1 foot of water. Changes in vertical flood elevations would differ depending on the severity of the flood event, which were analyzed through hydraulic modeling for the 2- to 100-year flood events. When differences exist in changes in vertical flood elevations, either the largest beneficial change or the largest adverse change is used to rate the intensity of effects, however, some alternatives could involve both adverse and beneficial effects. These are discussed under each of the alternatives.

TABLE 78. PUBLIC HEALTH AND SAFETY - FLOODING

Source: Flood Disaster Prevention Act, Park Service Management Policies, Marin CWP, CCC/LCP Zone II **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Long-Term	
No Impact	There would be no potential for impact to flooding of adjacent properties, homes, and public roads associated with the proposed project.
Negligible	There would be a negligible change in vertical flood elevations for adjacent homes, garages, driveways, and public roads (<0.25 vertical feet) associated with the proposed project; *OR* If adverse and increases in flooding exceed 0.25 vertical feet, the increase would NOT impact any private properties or properties owned by other agencies, homes, garage, driveways, or public roads or increase flooding to levels that would increase risk to public health and safety by decreasing ability of homeowners to access emergency services or decrease of emergency services to properties and public roads.
Minor	There would be a minor change in vertical flood elevations for adjacent properties, homes, garages, driveways, and public roads (>0.25 and ≤ 0.5 vertical feet) associated with the proposed project; *OR* If increases in flooding exceed 0.5 vertical feet, the increase would cause only minor flooding of undeveloped portions of private properties or properties owned by other agencies. It would NOT increase flooding to levels that would increase risk to public health and safety by decreasing ability of homeowners to access emergency services or decrease of emergency services to properties and public roads.

TABLE 78. PUBLIC HEALTH AND SAFETY - FLOODING

Moderate	There would be a moderate change in vertical flood elevations for adjacent properties, homes, garages, driveways, and public roads (>0.5 and ≤ 1.0 vertical feet) associated with the proposed project; *OR* If adverse and increases in flooding exceed 1.0 vertical foot, the increase might cause moderate flooding of undeveloped portions of private properties or properties owned by other agencies, but it would NOT increase flooding to levels that would increase risk to public health and safety by decreasing ability of homeowners to access emergency services or decrease of emergency services to properties and public roads.
Major or Substantial	There would be a substantial or major change in vertical flood elevations for adjacent homes, garages, driveways, and public roads (>1.0 vertical feet) associated with the proposed project. If adverse, the increase would potentially increase risk to public health and safety by substantially increasing flooding of homes, driveways, and public roads to levels that would decrease ability of homeowners to access emergency services or decrease of emergency services to properties and public roads.

Impact Analysis

TABLE 79. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR PUBLIC HEALTH AND SAFETY - FLOODING
All impacts would be considered Local Community and are considered Short-Term/Long-Term, unless otherwise specified.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Public Health and Safety – Flooding Levee Road - East	No Impact	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor
Public Health and Safety – Flooding Levee Road - West	No Impact	Beneficial - Moderate	Beneficial – Moderate/ Major	Beneficial – Moderate/ Major	Beneficial – Moderate/ Major
Public Health and Safety – Flooding Sir Francis Drake Blvd- Inverness Park	No Impact	No Impact	Adverse Minor	Adverse Moderate	Adverse Moderate

No Action Alternative

Analysis: The No Action Alternative would have no impact on risks to public health and safety associated with flooding in the Project Area and local community (Table 79). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities.

Under existing conditions, the Project Area and homes and county roads adjacent to the Project Area flood frequently. The Project Area and vicinity occurs in a low-lying alluvial valley at the confluence of at least five medium to large creeks, including Lagunitas Creek, Olema Creek, Bear Valley Creek, Fish Hatchery Creek, and Tomasini Creek. There are a number of smaller creeks that also cause flooding of roads and adjacent properties and homes.

Sir Francis Drake Blvd- Inverness Park: The closest homes to the Project Area are four homes along Sir Francis Drake Boulevard that are contiguous with the Giacomini Ranch West Pasture. While the West Pasture levees keep Lagunitas Creek waters far to their east, each of these properties is subject to flooding from the smaller Inverness drainages flowing adjacent to their property. Site surveys indicate that the elevation of these structures is 4- to 7 feet higher than the elevation of the West Pasture levee (10-12 feet). Hydrologic modeling suggests that the West Pasture levees overtop during flood events with 12-year recurrence interval (e.g. that occur, on average, every 12 years). For these homes, the West Pasture levees provide little in the way of protection for these homes from Lagunitas Creek flooding under flood events greater than the 12 year event. Hydrologic investigations and modeling conducted as part of baseline studies point to the primary flood risk currently for these properties and portions of Sir Francis Drake Boulevard in Inverness Park being the drainages that flow off the Inverness Ridge. These tributaries are culverted underneath Sir Francis Drake Boulevard and run either through or directly adjacent to at least three of these four properties and often

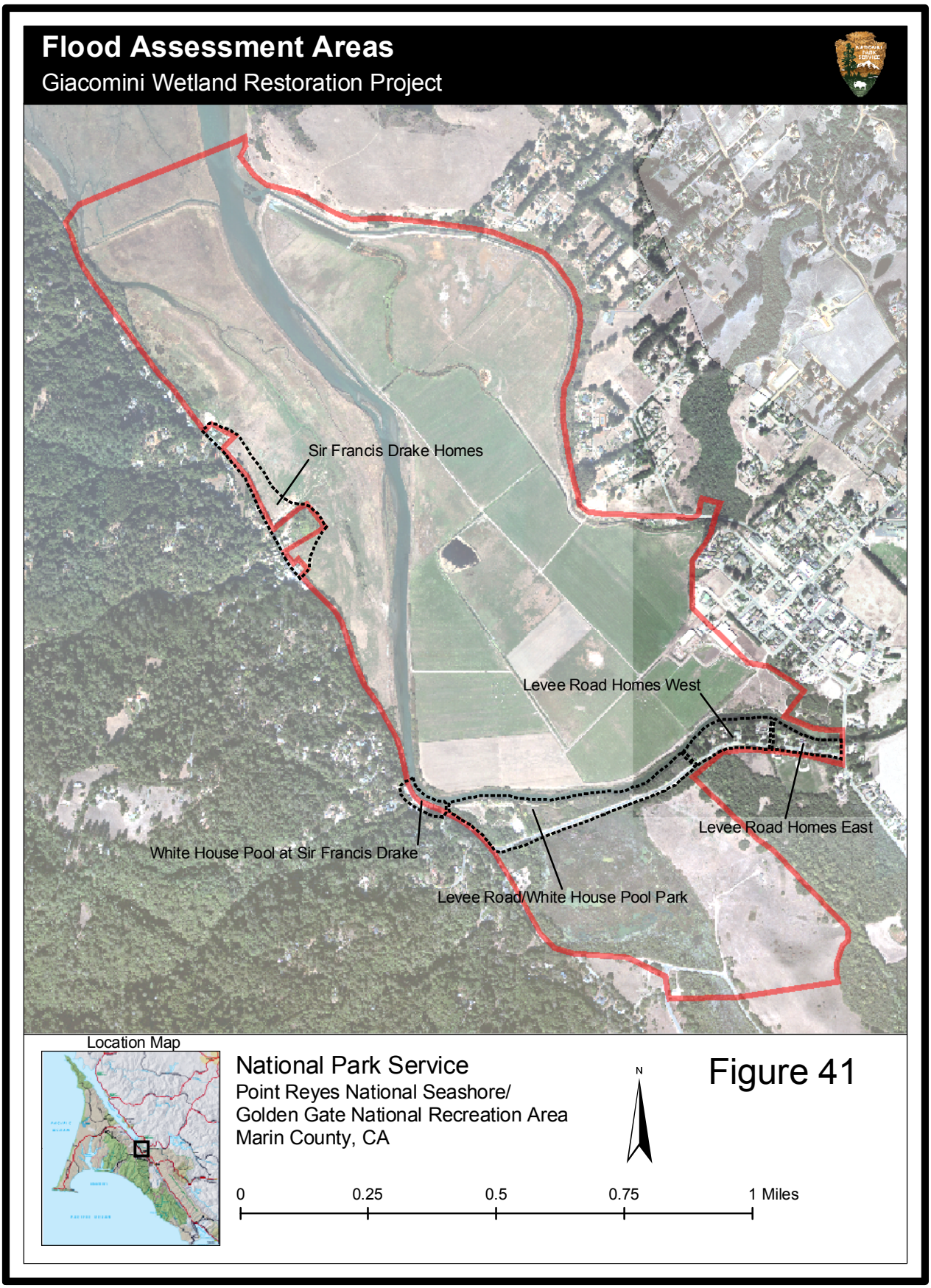

Flood Assessment Areas
Giacomini Wetland Restoration Project
Sir Francis Drake Homes
Levee Road Homes West
Levee Road Homes East
White House Pool at Sir Francis Drake
Levee Road/White House Pool Park
Location Map
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
N
0
0.25
0.5
0.75
1 Miles

Figure 41

deposit large amount of sediment that increase flood water stage or vertical flood elevation and cause back-up of floodwaters onto their properties (KHE 2006a).

Levee Road /Olema Marsh: Properties on Levee Road, directly south of the Giacomini Ranch East Pasture, are frequently flooded by Lagunitas Creek. A number of these homes have been elevated since the 1982 flood to decrease flood frequency. Hydrologic investigations and modeling conducted as part of baseline studies suggest that the height of the Giacomini Ranch East Pasture levees east of the Old Summer Dam locations is higher than the opposite creek bank where the Levee Road homes are located (KHE 2006a). This disparity between levee and creek bank height directs flood flows toward the homes (KHE 2006a). On average, flood flows overtop the southern bank of Lagunitas Creek during 3-year flood events (KHE 2006a). Local roads are typically posted with caution signs when there is approximately 4-6 inches of water on the road, and they are typically closed when there is somewhere between 1- to 2 feet of water, although emergency vehicles would be able to continue to use roads unless there is more than 2 feet of water (P. Maendle, Senior Road Maintenance Supervisor, County Public Works, *pers. comm*.).

Under the No Action Alternative, there would be no short term changes to levees in portions of the Project Area that would affect flooding. Over time, it is possible that levees would degrade and start to increase flood relief for homes along Levee Road, particularly as there would be no levee maintenance under the No Action Alternative. Some of the levees breached during the December 2005 storm event, and, according to some Levee Road residents, this breaching was accompanied by a large drop in flood stage or floodwater elevations. These levees are currently in the process of being repaired by the Giacomini family.

Flood risks are sometimes elevated when creek or streambeds aggrade or increase in elevation due to excessive sediment deposition or discontinuities in sediment transport. Based on field investigations and results of hydraulic modeling, streambed elevations in the portion of Lagunitas Creek within the Project Area appear to be relatively stable and not actively decreasing or increasing (KHE 2006a). Under the No Action Alternative, stream power and transport capacity in Lagunitas Creek would remain to baseline conditions, with transport of at least silts and fine sands occurring throughout the Project Area, except in between White House Pool and the cattle crossing (KHE 2006a). These results suggest that sediment transport processes in Lagunitas Creek under the No Action Alternative should not affect channel and streambed morphology or change the potential for flooding.

Within the Levee Road section, some of the worst flooding has occurred with the combination of high tides (>6.0 feet MLLW) and watershed flooding. This occurred in 1982 and during the New Year's Eve storm in 2005. Table 21 in Chapter 3 under Public Health and Safety shows the frequency of flooding relative to the vertical flood elevations predicted by computer hydraulic modeling (2006a) and topographic surveys (USGS 2003b).

In Olema Marsh, surface water levels have increased nearly 6 feet since the early 1990s. These elevated static water levels would continue to threaten Levee and Bear Valley Roads, which are already frequently flooded during even smaller flood events. These roads serve as important connecting roadways for residents of Inverness Park, Inverness, and other areas on the Point Reyes Peninsula and are the only connection to the "mainland" portion of Marin County.

While levee degradation is not predictable, this analysis assumes that breaches in the levees could occur within 5 years depending on climatic conditions and other factors. Therefore, the No Action Alternative is considered to have no effect on flooding in the short term. Over the long-term, flooding could increase under the No Action Alternative, because of the projected increases in sea level due to sea level rise. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There would be no potential for cumulative effects with other projects, because the No Action Alternative would have no impact.

Conclusions: The No Action alternative would have no impact on public health risks associated with flooding on Sir Francis Drake and Levee Road. The effects of levee degradation may be counter acted by sea level rise. Overall, long-term effects of the no action alternative would not impact existing public health risks associated with flooding on Sir Francis Drake and Levee Road.

Alternative A

Analysis: Alternative A would have beneficial minor to major effects by reducing risks to public health and safety associated with flooding in the Project Area and local community (Table 79). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture and western margin of the West Pasture (programmatic evaluation of a trail access to Inverness Park). The southern perimeter trail would include construction of a single span bridge across Lagunitas Creek, near the old summer dam location. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

Sir Francis Drake Blvd- Inverness Park and Inverness: In the West Pasture, the potential effects with respect to flooding of the four homes along Sir Francis Drake Boulevard would be the same as those described under the No Action Alternative. No change in vertical flood elevations would occur under the 2- to 10-year flood events.

As discussed under the No Action Alternative, hydrologic investigations and modeling conducted as part of baseline studies point to the primary flood risk currently for these properties and portions of Sir Francis Drake Boulevard in Inverness Park being the drainages that flow off the Inverness Ridge. These tributaries are culverted underneath Sir Francis Drake Boulevard and run either through or directly adjacent to at least three of these four homes and often deposit large amount of sediment that increase flood water stage or vertical flood elevation and cause back-up of floodwaters onto their properties (KHE 2006a).

Under Alternative A. public access facilities in the Sir Francis Drake/Inverness Park area include programmatic analysis of the trail between White House Pool and Inverness Park. There would be no overlooks in this area. The trail route to Inverness Park would be subject to flooding, but would be constructed in a manner that could withstand most flood flows.

Hydraulic modeling of vertical flood elevations north of the Project Area and south of the open water portions of Tomales Bay suggest that the added floodwater storage created by breaching the Giacomini Ranch East Pasture levees would effectively reduce vertical flood elevations across the entire Lagunitas Creek delta, including the undiked marsh north of the Giacomini Ranch towards Inverness. These results could change if the West Pasture levees erode, and Lagunitas Creek changes its current channel course. The levees have maintained the current channel alignment in roughly the center of the southern portion of the Bay. If levees were removed, the channel could change course and even reoccupy one of its historic alignments in what is currently the Fish Hatchery Creek channel, which is some distance west of the current channel. This alteration in channel alignment could change the effect of the proposed project in terms of flood scour and associated damage to adjacent lands and necessitate improvement and strengthening of levees for homes on the east side of Sir Francis Drake Boulevard north of the Project Area.

Levee Road /Olema Marsh: As discussed under the No Action Alternative, properties on Levee Road, directly south of the Giacomini Ranch East Pasture, are frequently flooded by Lagunitas Creek. A number of these homes have been elevated since the 1982 flood to decrease flood frequency. As noted above, hydrologic investigations and modeling conducted as part of baseline studies show that the levees in the East Pasture maintain a disparate water level which acts to direct flows toward the homes.
Under Alternative A, the frequency of overbank flooding of the southern bank of Lagunitas Creek would be reduced. Because the greatest potential for flooding occurs when high creek discharge from storm events is combined with an extreme high tide (>6.0 feet MLLW), all hydraulic modeling of changes in vertical flood elevation assume an extreme high tide, as well as creek flooding (KHE 2006a).

For the eastern portion of Levee Road, modeling indicates that vertical flood elevations could drop as much as 0.3 to 0.5 feet during most flood event scenarios (2 to 100 year events) based on hydraulic modeling results, resulting in a minor beneficial effect on flooding for the local community (KHE 2006a).

Changes in vertical flood elevations in Lagunitas Creek increase with distance downstream from the Green Bridge due to changes in slope of the water surface (KHE 2006a). Based on results from hydraulic modeling, the portions of Levee Road directly adjacent to White House Pool County Park and Olema Marsh would have reductions in vertical flood elevations ranging as high as 0.5- to 0.9 feet during 10-year flood events under Alternative A (KHE 2006a), resulting in a moderate beneficial effect on flooding and flood risks in the local community. Levee Road is the primary connecting roadway for the local community and would be one of the exit routes for people in Inverness Park, Inverness, and other areas on the Point Reyes Peninsula.

During a 5-year flood event, this alternative would decrease the potential for flooding along at least short (~300 feet) section of Levee Road and reduce the depth of flooding in the lowest sections near Olema Marsh by as much 0.5- to 0.8 feet relative to baseline conditions (KHE 2006a). This reduction in flooding depth could potentially reduce the number of times, or duration of Levee Road closure. Based on these changes, Alternative A would have a moderate beneficial effect on the western portions of Levee Road.

Flood risks are sometimes be elevated when creek or streambeds aggrade or increase in elevation due to excessive sediment deposition or discontinuities in sediment transport. Based on field investigations and results of hydraulic modeling, streambed elevations in the portion of Lagunitas Creek within the Project Area would be relatively stable and not actively decreasing or increasing (KHE 2006a). Under Alternative A, stream power and transport capacity in Lagunitas Creek would be expected to remain very similar to that under baseline conditions, at least in the reach upstream of White House Pool (KHE 2006a). Downstream of White House Pool, stream power would decrease slightly, although the capacity to transport at least silts and fine sands would remain equivalent (KHE 2006a). These results suggest that any changes in sediment transport processes in Lagunitas Creek caused by breaching of the East Pasture levee and other restoration or public access components should not affect channel and streambed morphology or change the potential for flooding.

Alternative A would include construction of the southern perimeter through-trail, including a new pedestrian-bicycle bridge across Lagunitas Creek. The approximately 2,750-foot enhanced trail from the Giacomini dairy facility would lead to construction of a 200-foot-long, 8-foot-wide bridge on Lagunitas Creek at the location of the old summer gravel dam that the Giacominis used to install for irrigation purposes. The bridge would be constructed at a relatively narrow portion of the Lagunitas Creek channel, which would enable the Park Service to construct the bridge such that none of the footings would be within the active floodplain. The bridge, however, would be within the 100-year floodplain, as would all of the other trail facilities constructed. Trails would be developed and maintained with the assumption that they would be flooded on a regular basis and would be constructed accordingly in terms of construction materials and methods. Therefore, trails are not included within development totals.

The bicycle-pedestrian bridge would be constructed to accommodate flows equal to or greater than the Green Bridge, which is located directly immediately upstream. Design elevations for the bridge would take into account reductions in vertical flood elevations in Lagunitas Creek with removal of the Lagunitas Creek levees under Alternative A. Based on hydraulic modeling analyses, the portions of Levee Road directly adjacent to White House Pool County Park and Olema Marsh would have reductions in vertical flood elevations ranging as high as in vertical flood elevations ranging as high as 0.5- to 0.9 feet during 10-year flood events under Alternative A (KHE 2006a). As a result, under restored conditions, elevation of the bridge would only need to exceed 16- to 17- feet NAVD88 to allow for conveyance of 10-year flood flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- and 100-year flood flows (KHE 2006a). These elevations include the 1- to 2-feet additional vertical feet of height that would be needed to provide some freeboard. During larger storms, the bridge would be inundated such that flows would pass over the deck, but flow velocities would be reduced in this reach relative to upstream locations, because overbank flooding would have occurred, thereby dissipating the erosive energy of flood flows. Using this type of approach, hydraulic modeling results suggest that the bridge would not have more than negligible adverse impacts on flooding in the Project Area.
Over the long-term, some of the benefits provided by Alternative A could be offset by increases in flooding related to projected increases in sea level due to sea level rise. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could lead to regular inundation of large portions of the East Pasture below 4 ft NAVD88.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: The Bear Valley Creek Watershed Enhancement and Fishery Restoration Project would replace failing or underperforming hydrologic infrastructure at a number of locations on Bear Valley Creek within the Seashore boundaries. There is no definitive timeframe for construction of this project. This project would be expected to benefit hydrologic and ecological processes on Bear Valley Creek and Olema Marsh, which may have direct and indirect impacts on flooding in Olema Marsh and even Lagunitas Creek. The effect of this project on flooding in Olema Marsh and Lagunitas Creek would be expected to have no more than a minor beneficial effect on flooding. Cumulatively, Alternative A, in combination with the Bear Valley Creek Watershed Enhancement and Fishery Restoration Project, would be expected to still have minor beneficial effects on flooding and risks from flooding to public health and safety.

Conclusions: Alternative A would have minor beneficial effects on flooding and risks from flooding to public health and safety through a reduction in flood frequency on Levee Road and vertical flood elevations along Levee Road. These reductions would not only benefit safety and emergency access for homeowners adjacent to the Project Area, but would decrease the extent of flooding along a short section of Levee Road and possibly reduce the potential for closure of Levee Road due to excessive flooding during more frequent (up to 5-year) flood events. Alternative A would not result in changes to the existing conditions to the properties along Sir Francis Drake and Inverness Park. Construction of a bridge as part of the southern perimeter trail would have no more than negligible adverse impacts on flooding, because bridge footings would be placed outside of the active floodplain, and the bridge would be high enough in elevation to allow for conveyance for larger flood flows.

Alternative B

Analysis: Alternative B would have beneficial minor to major effects on flooding and flood risks to public safety along Levee Road, but would have potentially minor adverse effects on private properties, if not homes, in Inverness Park adjacent to the West Pasture (Table 79). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture and western margin of the West Pasture (programmatic evaluation of a trail access to Inverness Park). The southern perimeter trail would include construction of a single span bridge across Lagunitas Creek, near the old summer dam location. A viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. The armored reach of Lagunitas Creek in the East Pasture would be restored through removal of rip-rap bank stabilization, regraded and revegetated. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Sir Francis Drake Blvd- Inverness Park and Inverness: The closest homes to the Project Area are four homes along Sir Francis Drake Boulevard that are contiguous with the Giacomini Ranch West Pasture. While the West Pasture levees keep Lagunitas Creek waters far to their east, each of these properties is subject to flooding from the smaller Inverness drainages flowing adjacent to their property. Site surveys indicate that the elevation of these structures is 4- to 7 feet higher than the elevation of the West Pasture levee (10-12 feet). Hydrologic modeling suggests that the West Pasture levees overtop during flood events with 12-year recurrence interval (e.g. that occur, on average, every 12 years). For these homes, the West Pasture levees provide little in the way of protection for these homes from Lagunitas Creek flooding under larger flood events.

As discussed under the No Action Alternative, hydrologic investigations and modeling conducted as part of baseline studies point to the primary flood risk currently for these properties and portions of Sir Francis Drake Boulevard in Inverness Park being the drainages that flow off the Inverness Ridge. These tributaries are culverted underneath Sir Francis Drake Boulevard and run either through or directly adjacent to at least three of these four homes and often deposit large amount of sediment that increase flood water stage or vertical flood elevation and cause back-up of floodwaters onto their properties (KHE 2006a).

Under Alternative B, the frequency of flooding in the West Pasture would increase from 12-year flood events to 2-year flood events (KHE 2006a). Hydraulic modeling indicates that, under Alternative B, because levees in the southern portion of the pasture would not be completely removed, but outflow of waters would be increased by removal of the West Pasture north levee and Fish Hatchery Creek tidegate, vertical flood elevations in the West Pasture would decrease by as much as 0.4 feet under 2- to 10-year flood events (KHE 2006a). However, during 50-year flood events, vertical flood elevations would increase up to potentially 1.0 foot within the easternmost undeveloped portion of some of the private properties, because of the increase in the volume of water and the loss of the channeling effect that the levees might have on Lagunitas Creek flood flow (KHE 2006a). This increase in vertical flood elevation would cause increased flooding of the lower and one-tenth to one-third of the two private properties north of Fish Hatchery Creek. The latter is an undeveloped, marshy area that would already be flooded to a lesser degree under baseline conditions, while the former is pasture (KHE 2006a). While the flood peak under the 50-year event would be expected to be higher, the duration of flooding would be expected to decrease considerably, because the removal of the north levee and tidegate would not cause extensive ponding as they do under baseline conditions. Because the maximum 1-foot increase in vertical flood elevation would not negatively affect homes, driveways, or access routes to roads, the adverse changes under Alternative B during the 50-year flood event are characterized as minor.

Hydraulic modeling of vertical flood elevations north of the Project Area and south of the open water portions of Tomales Bay suggest that the added floodwater storage created by removing the Giacomini Ranch levees would effectively reduce vertical flood elevations across the entire Lagunitas Creek delta, including the undiked marsh north of the Giacomini Ranch towards Inverness. Vertical flood elevations would not increase above those that currently exist under any of the alternatives (KHE 2006a). As discussed under Alternative A, these results could change if Lagunitas Creek change its current channel course. If levees were removed, the channel could change course and even reoccupy one of its historic alignments in what is currently the Fish Hatchery Creek channel, which is some distance west of the current channel. This alteration in channel alignment could change the effect of the proposed project in terms of flood scour and associated damage to adjacent lands and necessitate improvement and strengthening of levees for homes on the east side of Sir Francis Drake Boulevard north of the Project Area.

Potential effects of flooding on public access facilities in the Sir Francis Drake/Inverness Park area would be the same under Alternative C as described under Alternative A.

Levee Road /Olema Marsh: Properties on Levee Road, directly south of the Giacomini Ranch East Pasture, are frequently flooded by Lagunitas Creek. A number of these homes have been elevated since the 1982 flood to decrease flood frequency. As noted above, hydrologic investigations and modeling conducted as part of baseline studies show that the differences in height of the levees or creek banks between the East Pasture and the south bank of Lagunitas Creek/Levee Road acts to direct flows toward the homes.

Under Alternatives A and B, the frequency of overbank flooding of the southern bank of Lagunitas Creek would drop from a 3- year to 4-year flood recurrence interval or flood event. As some of the worst flooding occurs when high creek discharge from storm events is combined with an extreme high tide (>6.0 feet MLLW), all hydraulic modeling of changes in vertical flood elevation assume an extreme high tide, as well as creek flooding (KHE 2006a). Similar to Alternative A, vertical flood elevations for the eastern portion of Levee Road, where most of the homes occur, could drop as much as 0.3 to 0.5 feet during 5- to 10-year flood events based on hydraulic modeling results, resulting in a minor beneficial effect on flooding for the local community (KHE 2006a). As flood frequency either increases to a 2-year flood event or decreases to a 50-year flood event or greater, the change in vertical flood elevations under Alternative A relative to baseline conditions is actually smaller, ranging from approximately 0.1 to 0.3 feet (KHE 2006a). This decrease in vertical flood elevation reduction during larger storm events probably relates to the higher volumes of floodwater that offset, to some degree, increases in floodwater storage capacity in the Project Area with removal and/or breaching of the East Pasture and West Pasture levees.

Changes in vertical flood elevations in Lagunitas Creek increase with distance downstream from the Green Bridge due to changes in slope of the water surface (KHE 2006a). Based on results form hydraulic modeling, the portions of Levee Road directly adjacent to White House Pool County Park and Olema Marsh would have reductions in vertical flood elevations ranging as high as 0.6- to 1.1 feet during 10-year flood events under Alternative B (KHE 2006a), resulting in a moderate beneficial effect on flooding and flood risks in the local community. Levee Road is a major connecting roadway for the local community and would be one of the exit routes for people in Inverness Park, Inverness, and other areas on the Point Reyes Peninsula. Similar to

Alternative A, this alternative would decrease the potential for flooding during a 5-year flood event along at least short (~300 feet) section of Levee Road relative to baseline conditions(KHE 2006a). Relative to Alternative A, it would also slightly further reduce the depth of flooding in the lowest sections near Olema Marsh, with water depths decreased by as much 0.75- to 0.9 feet relative to baseline conditions (KHE 2006a). This change in flooding depth could potentially change total flooding depth to the extent that Levee Road would be posted with a caution sign rather than closed, with water depths averaging less than 1 foot. Based on these changes, Alternative B would have a moderate to major beneficial effect on the western portions of Levee Road.

Under Alternative B, stream power and transport capacity in Lagunitas Creek would be expected to remain very similar to that under baseline conditions, at least in the reach upstream of White House Pool (KHE 2006a). Downstream of White House Pool, stream power would decrease considerably, causing a sufficient enough loss in transport capacity to cause potential deposition silts and fine sands carried by floodwater flows (KHE 2006a). The magnitude of this change, however, would not be expected to appreciably change channel or streambed morphology or to elevate flood risks for private properties, particularly as this reach is well downstream of directly adjacent residential areas. These results suggest that any changes in sediment transport processes in Lagunitas
Creek caused by breaching and removal of levees and other restoration or public access components should not affect channel and streambed morphology or change the potential for flooding.

Potential effects of flooding on public access facilities such as the bridge in the Levee Road/Olema Marsh area would be the same under Alternative B as described under Alternative A.

Over the long-term, some of the benefits potentially provided by this alternative for Levee Road and Sir Francis Drake Boulevard properties may be negated by sea level rise, should rates of sea level rise be close to the much higher ones that were recently projected of 3 feet by 2100.

Possible Additional Mitigation Measures: One of the potential mitigation measures for reducing flood impacts to private properties on the east side of Sir Francis Drake Boulevard would be to construct low berms on the property perimeter, particularly for some of the lower elevation homes or developed properties or portions of properties. Based on results of hydraulic modeling, berms would not be needed to protect homes, garages, or driveways on these properties. For most of the lower elevation portions of properties, berms would need to be at least 2- to 3- vertical feet in height to maintain existing flood protection under 50- and 100-year flood events. The exact dimensions of the berm would depend upon which property it was being built to protect, and any berm constructed would require consultation with a geotechnical engineer to undertake the necessary soil/geotechnical studies and provide design assistance. As discussed earlier, hydrologic investigations and modeling conducted as part of baseline studies point to the primary flood risk currently for many of these properties and portions of Sir Francis Drake Boulevard in Inverness Park being the drainages that flow off the Inverness Ridge. Levees would need to be constructed such that creek flow and surface run-off from the Inverness Ridge could be conveyed to the West Pasture without causing flooding in bermed areas. Berms that inhibit the passage of these material or improperly designed berms could exacerbate flooding of properties by these creeks.

Effectiveness of Possible Additional Mitigation Measures: Levees would be effective at precluding inundation from Lagunitas Creek, but would tend to impound at least temporarily creek flow and surface run-off from the Inverness Ridge even if hydrologic infrastructure such as one-way flapgates on culverts were installed, thereby increasing the potential for flooding of these properties by upstream sources.

Cumulative Impacts: As with Alternative A. Alternative B, in combination with the Bear Valley Creek Watershed Enhancement and Fishery Restoration Project, would be expected to still have minor to major beneficial effects on flooding and risks from flooding to public health and safety.

Conclusions: Alternative B would have minor to major beneficial effects on flooding and risks from flooding to public health and safety for Levee Road and adjacent homes, however, modeling does show that on 50 year events and higher, there may be some minor increases in flood elevation on undeveloped portions of private properties adjacent to the West. As with Alternative A, Alternative B would reduce flooding of properties, homes, and driveways along Levee Road and decrease the extent, as well as the depth of flooding, on some of the lower elevation portions of Levee Road relative to baseline conditions during 5-year flood events. These reductions would not only benefit safety and emergency access for homeowners adjacent to the Project Area, but would reduce the potential for closure of Levee Road due to excessive flooding during at least 5-year flood

events. While this alternative may increase vertical flood elevation effecting undeveloped portions of West Pasture properties, flood elevations during smaller and more frequent flood events, would likely decrease relative to baseline conditions. Construction of a bridge as part of the southern perimeter trail would have no more than negligible adverse impacts on flooding, because bridge footings would be placed outside of the active floodplain, and the bridge would be high enough in elevation to allow for conveyance for larger flood flows.

Alternative C

Analysis: Alternative C would have identical beneficial minor to major effects on flooding and flood risks to public safety along Levee Road, but would have potentially moderate adverse effects on undeveloped portions of private properties in Inverness Park adjacent to the West Pasture (Table 79). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture and western margin of the West Pasture (programmatic evaluation of a trail access to Inverness Park). The southern perimeter trail would include construction of a single span bridge across Lagunitas Creek, near the old summer dam location. Access along the eastern perimeter would be scaled back through removal of the through-trail component. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Sir Francis Drake Blvd- Inverness Park and Inverness: The closest homes to the Project Area are four homes along Sir Francis Drake Boulevard that are actually contiguous with the Giacomini Ranch West Pasture. While the West Pasture levees keep Lagunitas Creek waters far to their east, each of these properties is subject to flooding from the smaller Inverness drainages flowing adjacent to their property. Site surveys indicate that the elevation of these structures is 4- to 7 feet higher than the elevation of the West Pasture levee (10-12 feet). Hydrologic modeling suggests that the West Pasture levees overtop during flood events with 12-year recurrence interval (e.g. that occur, on average, every 12 years). For these homes, the West Pasture levees provide little in the way of protection for these homes from Lagunitas Creek flooding under larger flood events.

Under Alternative C, the frequency of flooding in the West Pasture would be identical to that under Alternative B, with frequency increasing from 12-year flood events under baseline conditions to 2-year flood events (KHE 2006a). Hydraulic modeling indicates that vertical flood elevations in the West Pasture would increase by as much as 0.3 to 1.6 feet under 2- to 50-year flood events (KHE 2006a). This is because the levees would be completely removed, allowing flood flows full access to the West Pasture floodplain. However, during the 100-year flood event, the rate of increase would be reduced to between 0.5 to 0.75 feet (KHE 2006a). These increases in vertical flood elevation under the 2- to 50-year flood events would cause increased flooding of the lower, undeveloped (e.g., pastures, backyards, open space) portions of some properties during the 10-year and 50-year flood events. The largest increase in flooding of private property would take place at the parcel directly adjacent to Fish Hatchery Creek, however, flooding would occur only in the lower, undeveloped, marshy portions of the property that would already be flooded to a lesser degree during at least 50-year events under baseline conditions (KHE 2006a). Based on modeling results, the only flood event under which flooding of private property would occur during restored, but not baseline conditions, for parcels adjacent to the 1906 drainage would be the 50-year flood event, and flooding would be limited to a very small portion of the eastern perimeter of the properties. These properties actually have a fence that could limit floodwater intrusion to some degree, although floodwaters could back up into the 1906 drainage box culvert that runs through one of these properties. While the flood peaks under some of the flood events would be expected to be higher, the duration of flooding would be expected to decrease considerably, because the removal of the north levee and tidegate would not cause extensive ponding as they do under baseline conditions.

Because the maximum 1.6-foot increase in vertical flood elevation would not negatively affect homes, driveways, or access routes to roads, the adverse changes under Alternative C during the 50-year flood event were characterized as moderate. As discussed under the No Action Alternative, hydrologic investigations and modeling conducted as part of baseline studies point to the primary flood risk currently for these properties and portions of Sir Francis Drake Boulevard in Inverness Park being the drainages that flow off the Inverness

Ridge. These tributaries are culverted underneath Sir Francis Drake Boulevard and run either through or directly adjacent to at least three of these four homes and often deposit large amount of sediment that increase flood water stage or vertical flood elevation and cause back-up of floodwaters onto their properties (KHE 2006a).

Hydraulic modeling of vertical flood elevations north of the Project Area and south of the open water portions of Tomales Bay suggest that the added floodwater storage created by removing the Giacomini Ranch levees would effectively reduce vertical flood elevations across the entire Lagunitas Creek delta, including the undiked marsh north of the Giacomini Ranch towards Inverness. Vertical flood elevations would not increase above those that currently exist under any of the alternatives (KHE 2006a). Under Alternative C, vertical flood elevations for properties on the east side of Sir Francis Drake Boulevard directly adjacent to Fish Hatchery Creek could be 0.1 foot lower than under existing conditions, based on modeling results (KHE 2006a). As discussed under Alternative A, these results could change if Lagunitas Creek change its current channel course and reoccupies one of its historic alignments in what is currently the Fish Hatchery Creek channel, which is some distance west of the current channel. This alteration in channel alignment could change the effect of the proposed project in terms of flood scour and associated damage to adjacent lands and necessitate improvement and strengthening of levees for homes on the east side of Sir Francis Drake Boulevard north of the Project Area.

Potential effects of flooding on public access facilities in the Sir Francis Drake/Inverness Park area would be the same under Alternative C as described under Alternative A.

Levee Road/Olema Marsh: Changes in flood frequency and vertical flood elevations along Levee Road, as well as sediment transport and deposition patterns in Lagunitas Creek, would be identical to those discussed under Alternative B.

One of the largest changes under Alternative C relative to the other alternatives would come from restoration of Olema Marsh. By decreasing surface water levels by as much 4- to 6- feet in the now highly impounded marsh through improvements in hydraulic connectivity and drainage, this alternative would reduce the flood risk to Levee and Bear Valley Roads from Bear Valley Creek associated with the steadily increasing water levels in Olema Marsh. These roads serve as important connecting roadways for residents of Inverness Park, Inverness, and other areas on the Point Reyes Peninsula and are a bottleneck for access to the rest of Marin County.

Potential effects of flooding on public access facilities in the Levee Road/Olema Marsh area would be the same under Alternative C as described under Alternative A and B.

Over the long-term, some of the benefits potentially provided by this alternative for Levee Road and Sir Francis Drake Boulevard properties may be negated by sea level rise, should rates of sea level rise be close to the much higher ones that were recently projected of 3 feet by 2100.

Possible Additional Mitigation Measures: Possible mitigation measures would be the same as discussed under Alternative B.

Effectiveness of Possible Additional Mitigation Measures: The effectiveness of the proposed mitigation measures would be the same as discussed under Alternative B.

Cumulative Impacts: As with Alternative A and B. Alternative C, in combination with the Bear Valley Creek Watershed Enhancement and Fishery Restoration Project, would be expected to still have minor to major beneficial effects on flooding and risks from flooding to public health and safety.

Conclusions: Alternative C would have identical minor to major beneficial effects on flooding and risks from flooding to public health and safety for Levee and Bear Valley Roads and adjacent homes as Alternative B. However, it could have a moderate adverse effect on flooding of private properties in the Sir Francis Drake – Inverness Park portion of the evaluation area during at least the 50-year flood event. As with Alternative B, Alternative C would reduce flooding of properties, homes, and driveways along Levee Road and decrease the extent, as well as the depth of flooding, on some of the lower elevation portions of Levee Road relative to baseline conditions during 5-year flood events. These reductions would not only benefit safety and emergency access for homeowners adjacent to the Project Area, but would reduce the potential for closure of Levee Road due to excessive flooding during at least 5-year flood events. Construction of a bridge as part of the southern

perimeter trail would have no more than negligible adverse impacts on flooding, because bridge footings would be placed outside of the active floodplain, and the bridge would be high enough in elevation to allow for conveyance for larger flood flows.

Alternative D

Analysis: Alternative D would have identical effects on flooding and flood risks to public health and safety as Alternative C, with minor to major beneficial effects for Levee and Bear Valley Roads and adjacent homes and moderate adverse effects during 50-year flood events for properties adjacent to the West Pasture (Table 79). Removal and replacement of the Mesa Road culvert would alleviate potential road flooding hazards in that local area.

Possible Additional Mitigation Measures: Possible mitigation measures would be the same as discussed under Alternative B.

Effectiveness of Possible Additional Mitigation Measures: The effectiveness of the possible mitigation measures would be the same as discussed under Alternative B.

Cumulative Impacts: Cumulative impacts would the same as described under Alternative A.

Conclusions: Alternative D would have identical effects on flooding and flood risks to public health and safety as Alternative C, with minor to major beneficial effects for Levee Road and adjacent homes and moderate adverse effects during 50-year flood events for properties adjacent to the West Pasture.

Public Health and Safety – Disease and Public Health

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

One of the strongest concerns currently about wetlands and public health is the rapid spread of West Nile Virus. While the reservoir host for this virus is considered to be birds, it can be transmitted by mosquitoes. Unlike malaria and dengue fever, which is carried by only one type or genus of mosquito, several genera – a total of 44 species within all genera -- can carry West Nile, many of which also carry other mosquito-borne diseases, as well, including encephalitis and malaria.

Based on Park Service Management Policies (2006), native organisms such as mosquitoes that are often by perceived by the public as "pests" are viewed as natural elements of the ecosystem and are allowed to function unimpeded, except under certain conditions. One of these conditions under which native organisms are controlled or managed includes when they pose a human health hazard as determined by agencies such as the U.S. Public Health Service (Centers for Disease Control or the Park Service public health programs; NPS 2006, Section 4.4.5.1). California law requires that, if a problem source of mosquito production exists in waters or lands that have been artificially altered from natural conditions, the party responsible for altering conditions is liable for the cost of abatement or control of mosquitoes (California Heath and Safety Code 2000 *et seq*.). Enforcement of this law is the responsibility of local mosquito abatement districts, which are governmental organizations that are responsible for controlling specific disease vectors within their jurisdiction. As their name implies, mosquito abatement districts are primarily responsible for controlling mosquitoes as pest species and as disease vectors.
Jurisdiction of mosquito abatement districts extends over private, county, and state lands, but not federal lands. Federal agencies are responsible for vector control on federal lands. Because of concerns regarding West Nile, the western portion of Marin County was annexed into the Marin-Sonoma Mosquito and Vector Control District (District) in 2005.

While vector-borne diseases are not specifically discussed in its significance criteria, DOI has established the potential for significant impacts to public health and safety as one of the triggers requiring preparation of an EIS under NEPA. The county's CEQA guidelines focus on the potential for the project to create a health hazard or the potential for a health hazard.

General Assumptions and Methodologies

- None of the mosquitoes tested to date in Marin County have tested positive for West Nile, but the county has seven mosquito species present that have tested positive elsewhere in California or the United States, including mosquitoes in the genera *Culex*, *Ochlerotatus*, and *Anopheles* (District, unpub. data). The western encephalitis and northern house mosquitoes represent the largest West Nile Virus threats (District 2006).
- The proposed project has the potential to affect mosquito breeding conditions through changes in tidal and freshwater hydrologic processes, as well as changes in vegetation communities.
- Areas that would tend to favor mosquito production are those that would meet most of the following criteria:
  - Areas NOT subject to daily tidal action (Collins and Resh 1989);
  - Inundated areas NOT subject to vigorous mixing through wind, current, or tide (Jones & Stokes Associates 1995);
  - Inundated areas with extended water residence times and stagnant conditions (Collins and Resh 1989);
  - Inundated areas with poor water quality (high water temperature, high organic content; Collins and Resh 1989);
  - Areas with slowly increasing or receding water levels as opposed to either stable or rapidly fluctuating water levels (Jones & Stokes Associates 1995);
  - Inundated areas with emergent marsh on perimeter or scattered throughout;
  - Areas inundated permanently, seasonally, or temporarily (even for a few days; Jones & Stokes Associates 1995).
- Analysis of potential changes in mosquito breeding conditions, relative to baseline conditions, with implementation of the proposed project focuses on change in areal extent of habitat that would meet most of the criteria listed above (Table 80).
  - Areal extent of mosquito habitat was weighted during analysis to reflect low, medium, or high potential for providing optimal conditions for mosquito breeding.
- Some of the habitats with higher potential for providing optimal breeding conditions include:

  1. **Unvegetated**: Muted Tidal Open Water-Channel and Pond/Subtidal and Intertidal
  2. **Unvegetated**: Non-Tidal Open Water-Channel and Pond/Permanently, Seasonally, and Temporarily Flooded
  3. **Vegetated**: Non-Tidal and Muted Tidal – Permanently, Seasonally, and Temporarily Flooded habitats – All
  4. **Vegetated**: Tidal – Areas not inundated daily by tides, but frequently enough to cause temporary inundation or saturation of ground conditions.

TABLE 80. DISEASE AND PUBLIC HEALTH – DISEASE VECTORS

Source: NPS Management Policies, California Public Health and Safety Code **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no potential for impact to mosquito breeding conditions associated with the proposed project.
Negligible	There would be a negligible change (≤ 5 percent) in optimal mosquito breeding conditions associated with the proposed project related to the areal extent of habitats meeting some or all of the criteria for optimal breeding conditions.
Minor	There would be a minor change (> 5 percent and ≤ 15 percent) in optimal mosquito breeding conditions associated with the proposed project related to the areal extent of habitats meeting some or all of the criteria for optimal breeding conditions.
Moderate	There would be a moderate change (> 15 percent and ≤ 25 percent) in optimal mosquito breeding conditions associated with the proposed project related to the areal extent of habitats meeting some or all of the criteria for optimal breeding conditions.
Major or Substantial	There would be a major or substantial change (>25 percent) in optimal mosquito breeding conditions associated with the proposed project related to the areal extent of habitats meeting some or all of the criteria for optimal breeding conditions.

Impact Analysis

TABLE 81. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR PUBLIC HEALTH AND SAFETY – DISEASE AND PUBLIC HEALTH – DISEASE VECTORS

All impacts would be considered Local Community and are considered Construction/Short-Term/Long-Term, unless otherwise specified.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Construction/Short-Term	Beneficial Negligible	Adverse - Minor	Adverse - Minor	Adverse - Minor	Adverse - Minor
Long-Term	Beneficial - Minor	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Moderate	Beneficial - Moderate

No Action Alternative

Analysis: The No Action Alternative would have minor beneficial effects on risks to public health in the local community associated with breeding of disease vectors such as mosquitoes in the Project Area (Table 81). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities. The largest change under the No Action Alternative comes with expiration of the Reservation of Use agreement with the Giacomini Trust in March 2007 and discontinuation of active agricultural management and management practices.

Most of the beneficial effect of the No Action Alternative on breeding of mosquitoes stems from discontinuation of agricultural management practices. Under baseline conditions, infrastructure (e.g., levees, culverts, tidegates) or management practices have increased potential mosquito breeding habitat in the Giacomini Ranch and Olema Marsh by 1) creating water impoundments that increase water residence time and decrease flow and exchange, leading to stagnant water conditions; and 2) increasing the duration and extent of inundation. As described under Vegetation Resources, the Giacomini Ranch has remained largely wetland despite being diked more than 60 years ago. Flooding from creeks, run-off, groundwater, and, to a certain degree, tides, creates areas with variable duration of inundation and saturation, lasting from a few days to year-round. While levees were constructed to prevent flooding from Lagunitas Creek and Tomasini Creek into the pastures, they also act to impound waters within the pastures, thereby prolonging the duration of inundation and saturation (KHE 2006a). Construction of extensive ditch systems to drain pastures and/or convey irrigation waters also creates stagnant standing water in areas that often become vegetated. Tidegates installed on Fish Hatchery and Tomasini Creeks do not allow waters within these creeks to fully drain during low tides, further perpetuating the extent of stagnant conditions. Most of the southern portion of the East Pasture is flood irrigated for several months during the summer, often creating standing water for several weeks. Fields in the northern portion are typically spray-irrigated. Near the dairy facility, the Giacominis also maintain several waste ponds.

Six species of mosquitoes were found in the Project Area during some limited sampling conducted in June 2005 (District, unpub. data). These species included the Western encephalitis mosquito, tule mosquito (*Culex erythrothorax*), banded foul water mosquito (*Culex stigmatosoma), Culiseta particeps, Culiseta inornata, and Ochlerotatus dorsalis* (District, unpub. data). Based on this limited sampling, the most common species were the Western encephalitis mosquito, tule mosquito, *Culiseta particeps, and Culiseta inornata*. Of the mosquito species identified on the Giacomini Ranch, three of these have tested positive in California for West Nile: the Western encephalitis mosquito, tule mosquito, and banded foul water mosquito (District, unpub. data). The western encephalitis and northern house mosquitoes represent perhaps the largest threats in terms of the West Nile Virus (District 2006). The Western encephalitis mosquito is a standing water species that lay its eggs in water. Adults can emerge continuously throughout the summer and fall in areas that have been flooded for more than 2- to 3 weeks such as rice fields, poorly drained pastures, semi-permanent and permanently flooded wetlands, sewer treatment plants, and dairy farms (Kwasny et al. 2004).

Without irrigation during the summer, many higher elevation portions of the Giacomini Ranch East Pasture would convert into upland non-native grassland that would only be inundated when floodwaters in Lagunitas Creek would be able to overtop the existing levees. The Giacomini Ranch West Pasture is not irrigated. There would also be some benefit from the small restoration/mitigation component, which restores tidal action to the very northern tip of the East Pasture and the adjacent East Pasture Old Slough. Functional tidal marshes typically do not produce significant mosquito breeding populations (R. Keith, Assistant Manager, District, *pers. comm*.). However, tidally influenced areas that are inundated on a regular, but not daily, basis or areas that do not drain completely at low tide still have some potential for supporting breeding of mosquitoes (Collins and Resh 1989). Mid-marsh intertidal elevation zones or mid-marsh marshplains in the mitigation/restoration component were still rated as having the potential to support mosquito breeding, although the potential would be lower than that of the pastures and non-tidal brackish marsh the restored area is replacing. Under this alternative, the extent of habitat with some of the highest potential for supporting breeding mosquitoes would potentially drop from approximately 410 acres under baseline conditions to approximately 350 acres.

Some elements of the No Action Alternative could lead to an enhancement of mosquito habitat. Under this alternative, the ditch system in the East Pasture would remain, but it would not be dredged, and it is likely that the ditches would become overgrown with freshwater marsh vegetation, which would potentially increase its attractiveness to breeding mosquitoes. This conversion is reflected in the acreage numbers provided above. In addition, creeks and ditches in both the East and West Pastures support populations of mosquitofish (*Gambusia affinis*) that were probably introduced by the Giacominis for mosquito control purposes. This non-native species can survive under unmanaged conditions and is expected to remain in the Project Area under the No Action Alternative.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There would be no potential for cumulative effects with other projects under the No Action Alternative, with the possible exception of potential mosquito control efforts initiated by the District on adjacent private, local, and state lands. These lands could include private ranch lands to the south, County park lands, and CSLC lands to the north. In the past 18 months, since west Marin was annexed into the District, the District has treated many areas adjacent to the Project Area. The West Marin Mosquito Control Council (WMMCC) was formed about the time of the District annexation and has negotiated with the District in the past year to limit the type of treatments applied in West Marin relative to other parts of the district. The District has also agreed not to distribute mosquitofish in west Marin due to the potential ecological impacts of this non-native fish in the wild. Since annexation, both the District and the WMMCC have increased public awareness about reducing standing water and screening vents to limit mosquito breeding areas around homes.

Conclusions: The No Action alternative would have minor beneficial effects on risks to public health in the local community associated with decreased breeding of disease vectors such as mosquitoes in the Project Area. This would result from decreasing seasonally flooded grasslands and conversion of a small portion of the East Pasture to intertidal marsh. These beneficial effects are tempered to some degree by the fact that discontinuation of practices such as ditching would lead some unvegetated portions of ditches to become choked with freshwater marsh vegetation, which is more attractive for mosquito breeding, and there would be no active restocking of mosquitofish. Impounded conditions within Olema Marsh would continue to provide optimal breeding habitat for mosquitoes. The No Action Alternative would result in discontinuation of flood irrigation and closure of dairy facilities adjacent to populated areas. Overall, these changes would result in minor beneficial effects on public health.

Alternative A

Analysis: Alternative A would have moderate beneficial effects on risks to public health and safety associated with breeding of disease vectors such as mosquitoes in the Project Area and local community (Table 81). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration

would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of manure ponds, pumps, pipelines, and concrete spillways. As with the No Action Alternative, agricultural management practices such as ditching, irrigation, and spreading of manure would be discontinued.

As with the No Action Alternative, most of the beneficial effect of Alternative A on breeding of mosquitoes stems from discontinuation of agricultural management practices and deconstruction of agricultural infrastructure, including filling ditches, in the East Pasture. Under baseline conditions, infrastructure (e.g., levees, culverts, tidegates) or management practices have increased potential mosquito breeding habitat in the Giacomini Ranch and Olema Marsh by 1) creating water impoundments that increase water residence time and decrease flow and exchange, leading to stagnant water conditions; and 2) increasing the duration and extent of inundation. Flooding from creeks, run-off, groundwater, and, to a certain degree, tides, creates areas within the wetland-dominated Giacomini Ranch with highly variable periods of inundation and saturation, lasting from a few days to year-round. Levees and tidegates do not allow waters to drain fully during low tides, thereby increasing water residence time and extending the seasonal period of inundation or saturation. Construction of extensive ditch systems in the East Pasture to drain pastures and/or convey irrigation waters has also created stagnant standing water areas. Most of the East Pasture has been flood or spray-irrigated for several months during the summer, often creating standing water for at least several weeks. Near the dairy facility, the Giacominis also maintain several manure waste ponds.

A large proportion of the Wet Pasture in the East Pasture would convert to Tidal Salt Marsh, which would decrease, if not eliminate, the propensity for mosquito breeding. Under this alternative, the extent of habitat with some of the highest potential for supporting breeding mosquitoes would potentially drop from approximately 410 acres under baseline conditions to approximately 165 acres, a decrease of almost 60 percent. Functional tidal marshes typically do not produce significant mosquito breeding populations (R. Keith, Assistant Manager, District, *pers. comm*.). In San Francisco Bay, full tidal action has been shown to decrease mosquito numbers by as much as 98.7 percent relative to either pre-restoration conditions (Kramer et al. 1995) or adjacent impounded marshes (Liu 2001). Relative to unrestored areas, reintroducing tidal action decreases mosquito populations in two ways: by providing habitat for the natural predators of mosquitoes and by reducing flooding in areas that are not normally wet (IWCP 2001) At least one mosquito control agency in Massachusetts actually opted to eliminate ditching and chemical control practices in favor of restoring tidal morphology and hydrology, including ponded features such as salt pannes, and observed a 97 percent effectiveness rate (J. MacDougall, pers. comm. *in* (Dalia 1998). However, tidally influenced areas that are inundated on a regular, but not daily, basis or areas that do not drain completely on low tides still have some potential for supporting mosquito breeding (Collins and Resh 1989).

Tidal restoration would be most effective for controlling mosquitoes in tidal channels and low marsh intertidal elevations. As in the undiked marsh north of the Giacomini Ranch, portions of the mid-marsh intertidal elevations or mid-marsh marshplains that are not inundated regularly by tidal action, but that receive at least infrequent surface flooding, would most likely continue to support mosquito breeding, although numbers would drop relative to baseline conditions. The highest upland elevations would continue to have low mosquito numbers, except where emergent groundwater from the Point Reyes Mesa creates localized freshwater marsh and wet meadow habitats on the perimeter of the East Pasture. The expanded extent of riparian habitat would also support lower numbers of mosquitoes, except where prolonged ponding occurs. Existing riparian habitat with marshy conditions, where higher mosquito numbers may occur, include the portion of Tomasini Creek just upstream of Mesa Road and the riparian habitat at the south end of the West Pasture.

Species composition would shift under restored versus impounded conditions, as well. Based on limited sampling, the most common species on the Giacomini Ranch are the Western encephalitis mosquito, tule mosquito, *Culiseta particeps, and Culiseta inornata.* Two of these species have tested positive elsewhere in California for West Nile Virus -- the Western encephalitis mosquito and tule mosquito. A third species, the banded foul water mosquito, was also found in the Project Area, but does not appear to be common (District, unpub. data). The Western encephalitis and tule mosquitoes are both standing water species. The former has been linked to areas that are flooded for more than 2 to 3 weeks, such as poorly drained pastures, semi-permanent and permanently flooded wetlands, and dairy farms (Kwasny et al. 2004). Without irrigation during the summer, many higher elevation portions of the Giacomini Ranch East Pasture would convert into upland non-native grassland that would only be infrequently inundated when floodwaters in Lagunitas Creek

overtop the existing levees. Under Alternative A, flooding frequency would increase to at least every 2 years or more. The Giacomini Ranch West Pasture has not been irrigated. Reintroduction of more saline waters into lower elevation areas would likely attract higher numbers of saltmarsh mosquitoes of the genus, *Ochlerotatus*, such as *Ochlerotatus squamiger*. This mosquito breeds in prolific numbers in brackish intertidal waters and drainage ditches, laying eggs just above the high tide mark beginning each spring, as water levels recede until the following winter. *O. squamiger* is known to transmit certain strains of encephalitis, but is not a documented carrier of West Nile Virus.

Breaching of the East Pasture levee would reintroduce tidal action into the northern portion of the East Pasture Old Slough, while most of the ditch system would be eliminated through fill and grading. Drawdown would not be as pronounced in the East Pasture as in many other managed tidal units, which may limit breeding areas for *Ochlerotatus*. Portions of the East Pasture Old Slough with strong tidal velocities or that drain fully during low tide would have less potential to support mosquito breeding than areas where residual pools remain at low tide. Reintroduction of tidal influence into the East Pasture Old Slough would also increase the diversity and number of mosquito predators through increased access for native estuarine fish. During higher high tide events, overbank flooding would occur, allowing fish species access to the marshplain and mosquito larvae that may have been deposited in these areas.

Construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding and have minor adverse impacts (Table 81). In addition, muted tidal or impounded freshwater conditions would continue to persist in the Giacomini Ranch West Pasture and Olema Marsh, respectively. There would be no restoration component in the West Pasture or Olema Marsh under Alternative A. As with the Giacomini Ranch, levees and other infrastructure have created impounded conditions within Olema Marsh that increase the potential for mosquito breeding. Sampling conducted in 2005 found five species of mosquitoes. Three of these species have tested positive for the West Nile Virus elsewhere in California (District, unpub. data).

The Park Service uses an Integrated Pest Management Program to reduce the risk to the public, park resources, and the environment from pests and pest-related management strategies (NPS 2006, Section 4.4.5.2). Normally, source reduction -- eliminating or altering the water so that the mosquitoes cannot breed or complete their life cycle -- is the first choice for control (NPS, IPM Manual). If source reduction is impossible or incomplete, the next tactic considered is biological control of the larvae with predators, bacterial insecticides, or growth regulators (NPS, IPM Manual). Potential mitigation measures for construction-related impoundments would include ensuring that they are installed for the minimum amount of time necessary to complete the construction task. Mitigation would also include monitoring of pooled water for mosquito larvae as well as the potential use of the mosquito larvicide, *Bacillus thuringensis* (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable and does not have measurable effects on other species.

Source reduction and vegetation management would not be considered a viable strategy for natural areas, including restored or created habitats such as the freshwater marsh in the East Pasture that is being specifically constructed to pond for a sufficient duration to create habitat for breeding of federally threatened California red-legged frog (*Rana aurora draytonii*). The Park Service would either monitor this area itself or amend its current permit with the Marin-Sonoma Mosquito & Vector Control District (District) such that it could monitor this area, which is adjacent to a rural residential area. Based on the Seashore's West Nile Virus Standard Operating Procedure (SOP), the Seashore would then review monitoring results and decide whether to treat with *Bacillus thuringiensis* (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable, and does not have measurable effects on other species.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under the No Action Alternative.

Conclusions: Alternative A would have moderate beneficial effects on risks associated with breeding of disease vectors such as mosquitoes in the Project Area by decreasing the extent of seasonally flooded grasslands in the East Pasture. Conversion to salt marsh would be expected to reduce, if not eliminate, mosquito breeding, with the highest benefits associated with well-draining, fast-moving tidal creeks and low intertidal and very high vegetated intertidal elevation marsh "zones." Portions of mid-marsh "zones" or

marshplains that are not regularly inundated by tides, but receive infrequent tidal inundation, may continue to provide breeding habitat for mosquitoes, particularly saltmarsh mosquitoes of the genus, *Ochlerotatus*, such as *Ochlerotatus squamiger*. While *O. squamiger* is known to transmit certain strains of encephalitis, it is not a documented carrier of West Nile Virus. Reconnection of the East Pasture Old Slough to Lagunitas Creek would increase the diversity and number of estuarine mosquito predators. While this alternative would reduce habitats with the highest potential for supporting mosquito breeding by almost 60 percent, muted tidal and/or impounded conditions within the West Pasture and Olema Marsh would continue to provide optimal breeding habitat for mosquitoes. Overall, this alternative would be expected to reduce numbers of mosquitoes through reintroduction of tidal flushing and conversion to tidal salt marsh and discontinuation of agricultural management practices such as irrigation.

Alternative B

Analysis: Alternative B would have moderate beneficial effects on risks associated with breeding of disease vectors such as mosquitoes in the Project Area and local community (Table 81). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and expanded excavation of tidal channels. Breaches would be created in the West Pasture levee. The whole southern East Pasture creek bank would be restored through removal of rip-rap bank stabilization and regraded, where needed, to a more stabile profile. The levee adjacent to the Hunt Shack would be lowered to allow for overflow during flood events between the East Pasture and Tomasini Creek, but during regular flow conditions, Tomasini Creek would remain in its current channel with the tidegate/flashboard dam structure still in place. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the existing informal trail on the West Pasture north levee, which would be removed. As with Alternative A, this alternative would involve removal of agricultural infrastructure and discontinuation of agricultural management practices such as ditching, irrigation, and spreading of manure.

As with Alternative A, most of the beneficial effect of Alternative B to public safety stems from discontinuation of agricultural management practices and deconstruction of agricultural infrastructure. Under baseline conditions, infrastructure (e.g., levees, culverts, tidegates) or management practices such as flood and spray irrigation in the summer months, have increased potential mosquito breeding habitat in the Giacomini Ranch and Olema Marsh by 1) creating water impoundments that increase water residence time and decrease and exchange, leading to stagnant water conditions; and 2) increasing the duration and extent of inundation.

Under this alternative, a large proportion of the wet pasture habitat in the East Pasture and a smaller proportion of the wet and salt marsh pasture habitat in the West Pasture would convert to tidal salt marsh, which would decrease the propensity for mosquito breeding. Under this alternative, the extent of habitat with the highest potential for supporting breeding mosquitoes would decrease from approximately 410 acres under baseline conditions to approximately 96 acres, a 75 percent reduction. As described under Alternative A, functional tidal marshes typically do not produce significant mosquito breeding populations (R. Keith, Assistant Manager, District, *pers. comm*.), with reduction in of mosquitoes in areas where full tidal action has been restored of up to 98.7 percent relative to pre-restoration conditions (Kramer et al. 1995) or adjacent impounded marshes (Liu 2001). Some tidally influenced areas which may not drain completely on low tides will still have some potential for supporting breeding of mosquitoes (Collins and Resh 1989).

Tidal restoration would be most effective for controlling mosquitoes in tidal channels and low marsh intertidal elevations. Similar to the undiked marsh north of the Giacomini Ranch, portions of the mid-marsh intertidal elevations or mid-marsh marshplains that are not inundated regularly by tidal action, but that receive at least infrequent surface flooding, would be most likely to continue to support mosquito breeding, although numbers would drop relative to baseline conditions. Marsh elevations would generally be lower in the East Pasture than the West Pasture, with much of the West Pasture above Mean High Water (MHW) elevations. Higher upland elevations would have naturally low mosquito numbers, except where emergent groundwater from the Point Reyes Mesa and Inverness Ridge creates localized freshwater marsh and wet meadow habitats on the perimeter of the East Pasture. Because the creek and groundwater influence is stronger in the West Pasture, most of the western and southern perimeters of the West Pasture would remain largely unchanged, dominated by considerable expanses of freshwater marsh and wet meadow. The expanded extent of riparian habitat would also support lower numbers of mosquitoes, except where prolonged ponding occurs. Existing riparian habitat with marshy conditions, where higher mosquito numbers may occur, include the portion of Tomasini Creek just upstream of Mesa Road and the riparian habitat at the south end of the West Pasture.

As with Alternative A, species composition in restored areas would shift relative to baseline conditions. This shift would be expected to be more dramatic in the East Pasture than the West Pasture. Based on limited sampling, the most common species on the Giacomini Ranch are the Western encephalitis mosquito, tule mosquito, *Culiseta particeps, and Culiseta inornata. .* Two of these species have tested positive elsewhere in California for West Nile Virus -- the Western encephalitis mosquito and tule mosquito. A third species, the banded foul water mosquito, was also found in the Project Area, but does not appear to be common (District, unpub. data). The Western encephalitis and tule mosquitoes are both standing water species, the former linked to areas that are flooded for more than 2- to 3 weeks (Kwasny et al. 2004). Without irrigation during the summer, many higher elevation portions of the Giacomini Ranch East Pasture would convert into upland non-native grassland that would only be infrequently inundated when floodwaters in Lagunitas Creek spread onto the floodplain. The Giacomini Ranch West Pasture has not been irrigated. Reintroduction of more saline waters into lower elevation areas would likely attract higher numbers of saltmarsh mosquitoes of the genus, *Ochlerotatus*, such as *Ochlerotatus squamiger*. This mosquito breeds in prolific numbers in brackish intertidal waters and drainage ditches, laying eggs just above the high tide mark beginning each spring, as water levels recede until the following winter. *O. squamiger* is known to transmit certain strains of encephalitis, but is not a documented carrier of West Nile Virus.

As described under Alternative A, removal or breaching of the Giacomini Ranch levees would reintroduce tidal action into the northern portion of the East Pasture Old Slough, while most of the ditch system would be eliminated through fill and grading. The tidal channel network would be expanded relative to Alternative A through additional excavation. In the West Pasture, Fish Hatchery Creek and the West Pasture Old Slough would be converted from muted tidal to fully tidal. Drawdown following heavy winter rains may be more pronounced in the West Pasture than the East Pasture, which may maintain breeding for mosquitoes such as *Ochlerotatus*. Creeks and tidal channels with strong tidal velocities or that drain fully during low tide would have less potential to support mosquito breeding than areas where residual pools remain at low tide. Reintroduction of tidal influence into the East Pasture Old Slough would also increase the diversity and number of mosquito predators through increased access for native estuarine fish. During higher high tide events, overbank flooding would occur, allowing fish species access to the marshplain and mosquito larvae that may have been deposited in these areas.

As described under Alternative A, construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding and have minor adverse impacts (Table 81). In addition, muted tidal or impounded freshwater conditions would continue to persist in portions of the Giacomini Ranch West Pasture and Olema Marsh, respectively. Potential monitoring and mitigation measures would be identical to those described under Alternative A.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under the No Action Alternative.

Conclusions: Alternative B would have moderate beneficial effects on public health in the local community by reducing availability of freshwater mosquito breeding habitat in the Project Area. Conversion to salt marsh would be expected to reduce mosquito breeding habitat, with the highest benefits coming from well-draining, fast-moving tidal creeks and low intertidal and very high vegetated intertidal elevation marsh "zones." Portions of mid-marsh "zones" or marshplains that are not regularly inundated by tides, but receive infrequent tidal inundation, may continue to provide breeding habitat for mosquitoes, particularly saltmarsh mosquitoes of the genus, *Ochlerotatus*, such as *Ochlerotatus squamiger*. While *O. squamiger* is known to transmit certain strains of encephalitis, it is not a documented carrier of West Nile Virus. Reconnection of the expanded East Pasture Old Slough and Fish Hatchery Creek to Lagunitas Creek would increase the diversity and number of estuarine fish predators. While this alternative would be expected to reduce existing mosquito breeding habitat by 75 percent, impounded conditions within Olema Marsh would persist. In addition, the restoration actions will result in expansion of potential salt marsh mosquito breeding habitat, as well as creation of temporary impoundments during construction. The Park Service would institute mitigation measures to minimize impacts, including limiting the duration of impoundment during construction, monitoring during construction, and treating, if necessary, with Bacillus thuringensis (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable and does not have measurable effects on other species. Also, the

Park Service may monitor or contract for monitoring of permanently impounded areas that could increase the potential for mosquito breeding, although treatment would be conducted by the Park Service. Overall, the beneficial effects would primarily result from decreases in the extent of seasonally flooded grasslands in the East and West Pastures through reintroduction of tidal flushing and conversion to tidal salt marsh and from discontinuation of agricultural management practices such as irrigation and ditching.

Alternative C

Analysis: As with Alternative B, Alternative C would have moderate beneficial effects on risks to public health and safety associated with breeding of disease vectors such as mosquitoes in the Project Area and local community (Table 81). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. A small tidal channel would be initiated off Lagunitas Creek, as well as in the interior of the East Pasture. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices such as ditching, irrigation, and spreading of manure.

As with the other alternatives, most of the beneficial effect of Alternative C on breeding of mosquitoes stems from discontinuation of agricultural management practices and conversion of seasonally flooded grasslands to intertidal salt marsh through deconstruction of infrastructure such as levees, tidegates, and ditches in the Giacomini Ranch. Under this alternative, the extent of habitat with some of the highest potential for supporting breeding mosquitoes would potentially drop from approximately 410 acres under baseline conditions to approximately 84 acres, a decrease of nearly 80 percent. These effects are discussed in detail under Alternative B. As referenced above, one relevant change in restoration of the Giacomini Ranch under Alternative C involves rerouting of the lower two-thirds of Tomasini Creek within the Project Area into the East Pasture. This could decrease stream velocities and increase water residence time in the former Tomasini Creek channel that runs along the edge of the Point Reyes Mesa. The former channel would remain and function as a brackish slough, continuing to receive muted tidal influence from Lagunitas Creek/Tomales Bay and freshwater influence from hillside and toeslope groundwater seeps on the Point Reyes Mesa. The increase in water residence time could increase the attractiveness of the open water and emergent portions of this backwater slough channel to breeding mosquitoes.

One of the largest changes under Alternative C comes from incorporation of Olema Marsh into the restoration project. As with the Giacomini Ranch, levees and other infrastructure have created impounded conditions within the marsh that increase the potential for mosquito breeding. Sampling conducted in October 2005 found five species of mosquitoes, with the tule mosquito (*Culex erythrothorax*) by far the most prevalent (District, unpub. data). Other species observed included the banded foul water mosquito (*Culex stigmatosoma*), northern house mosquito (*Culex pipiens), Culiseta particeps,* and *Culiseta inornata,* many of the same species that occur at the Giacomini Ranch (District, unpub. data). Three of these species, northern house mosquito, tule mosquito, and banded foul water mosquito, have tested positive for West Nile Virus elsewhere in California. Like the western encephalitis mosquito, the tule mosquito is another standing water mosquito that deposits its eggs among thick vegetation on the edges or margins of lakes and inland ponds. It is also one of the few mosquitoes that feeds actively during the day (Kwasny et al. 2004).

Under this alternative, an adaptive restoration approach is undertaken to improve hydraulic connectivity and drainage through removal of berms, shallow excavation within the Bear Valley Creek channel, and possible replacement of two culverts. Over the last decade, water surface levels within the marsh appear to be rapidly increasing, possibly due to loss of one of what was once two culverts, with water surface levels increasing by as much as 6 feet since the early 1990s (KHE 2006a). This adaptive restoration approach could potentially lower the surface water level within the highly impounded marsh by as much as 4- to 6 feet over an extended period of time (KHE 2006a).

Over the short term, lowering of the water surface levels would be accompanied by some dramatic sediment, water, and vegetation changes that are described in detail in this chapter under Soil, Water Resources-Water

Salinity and Water Quality, and Vegetation Resources. In summary, lowering of the water surface level would expose the upper surface layers of the organic-rich peat soils to air, causing them to decompose and compact, causing temporary pulses of nutrients and dissolved organic material into the overlying waters, as well as transient episodes of acidification. This dewatering would lead to an extensive die-back in the tall emergent freshwater marsh vegetation that currently dominates almost 39 acres of Olema Marsh. During this period, poor water quality conditions could continue to attract mosquitoes, although residence time of waters within the marsh would decrease appreciably, with the possible exception of some of the areas on the western perimeter, where small drainages and emergent groundwater would continue to create ponded conditions.

Ultimately, over the long term, freshwater marsh vegetation would be expected to recolonize at a lower marsh surface elevation throughout most of the marsh, although tall emergent brackish marsh vegetation could colonize a small (~2 acres) portion of the marsh directly near the Bear Valley Creek outlet to Lagunitas Creek. Water surface levels, in general, would be lower than under baseline conditions, but inundation and ponding would continue to persist throughout most of the marsh, due to the influence of perennial freshwater sources such as Bear Valley Creek and some of the drainages and emergent groundwater on the western perimeter. The long-term effect of these actions on mosquito populations is hard to predict, but, overall, the adaptive restoration component would be expected to have a very minor to minor beneficial effect on mosquito breeding conditions, due to the decrease in water residence time, long-term improvement expected in water quality conditions, and improved access to the marsh for estuarine fish predators. These beneficial effects would be expected to offset any increase in mosquito breeding habitat that results from creation of approximately 2 acres of seasonally flooded freshwater marsh ponds on the west side of Olema Creek as mitigation for impacts to California red-legged frog.

As described under Alternative A, construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding and have minor adverse impacts (Table 81). In addition, muted tidal or impounded freshwater conditions would continue to persist in portions of the Giacomini Ranch West Pasture and Olema Marsh, respectively. Potential monitoring and mitigation measures would be identical to those described under Alternative A.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Same as described under the No Action Alternative.

Conclusions: Alternative C would have moderate beneficial effects on risks to public health in the local community associated with breeding of disease vectors such as mosquitoes in the Project Area. Most of these benefits would result from decreasing the extent of seasonally flooded grasslands in the Giacomini Ranch through reintroduction of tidal flushing and conversion to salt marsh and from discontinuation of agricultural management practices such as irrigation and ditching. Conversion to salt marsh would be expected to reduce, if not eliminate, breeding of mosquitoes, with the highest benefits coming from well-draining, fast-moving tidal creeks and low intertidal and very high vegetated intertidal elevation marsh "zones." Portions of mid-marsh "zones" or marshplains that are not regularly inundated by tides, but receive infrequent tidal inundation, may continue to provide breeding habitat for mosquitoes, particularly saltmarsh mosquitoes of the genus, *Ochlerotatus*, such as *Ochlerotatus squamiger*. While *O. squamiger* is known to transmit certain strains of encephalitis, it is not a documented carrier of West Nile Virus. Reconnection of the expanded East Pasture Old Slough and Fish Hatchery Creek to Lagunitas Creek would increase the diversity and number of estuarine fish predators. Improved connection between Project Area creeks and restoration of natural tidal marsh conditions is expected to reduce stagnant water in the Project Area, thereby limiting potential mosquito breeding areas.

In addition, under this alternative, hydraulic connectivity and drainage within Olema Marsh would be improved through an adaptive restoration approach that would result in dramatically lower water surface levels relative to baseline conditions. Continued inflow from permanent freshwater sources would continue to create breeding conditions for mosquitoes over the long-term, leading this alternative to have only minor beneficial effects on mosquito breeding conditions in this particular portion of the Project Area. Overall, this alternative would be expected to reduce habitats with the highest potential for supporting mosquito breeding by almost 80 percent, although mosquitoes would continue to reproduce in lower numbers within both the Giacomini

Ranch and Olema Marsh. These beneficial effects would be expected to offset any increase in mosquito breeding habitat that results from creation of approximately 2 acres of seasonally flooded freshwater marsh ponds in the adjacent Olema Creek watershed as mitigation for impacts to California red-legged frog.

Construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding. In addition, muted tidal or impounded freshwater conditions would continue to persist in portions of the Giacomini Ranch West Pasture and Olema Marsh, respectively. The Park Service would institute mitigation measures to minimize impacts, including limiting the duration of impoundment during construction, monitoring during construction, and treating, if necessary, with Bacillus thuringensis (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable and does not have measurable effects on other species. Also, the Park Service may monitor or contract for monitoring of permanently impounded areas that could increase the potential for mosquito breeding, although treatment would be conducted by the Park Service.

Alternative D

Analysis: Alternative D would have very similar moderate beneficial effects on breeding of disease vectors such as mosquitoes in the Project Area as Alternative C (Table 81). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all of the relevant differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to intertidal elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and excavation of even more new tidal channels in the East Pasture.

As with all the other alternatives, most of the beneficial effect of Alternative D on breeding of mosquitoes stems from discontinuation of agricultural management practices and conversion of seasonally flooded grasslands to intertidal salt marsh through deconstruction of infrastructure such as levees, tidegates, and ditches in the Giacomini Ranch. These effects are discussed in detail under Alternative B. Under this alternative, the extent of habitat with some of the highest potential for supporting breeding mosquitoes would potentially drop from approximately 410 acres under baseline conditions to approximately 70 acres, a decrease of almost 83 percent. The small decrease in extent of high potential habitat relative to Alternative C results from lowering of the southwestern portion of the East Pasture to elevations subject to more frequent tidal inundation. As was discussed under Alternative C, restoration of Olema Marsh would be expected to have only minor beneficial effects over the long-term on mosquito breeding conditions, with possible increases during the short-term as the marsh adjusts to dramatically lower water surface levels.

As described under Alternative A, construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding and have minor adverse impacts (Table 81). In addition, muted tidal or impounded freshwater conditions would continue to persist in portions of the Giacomini Ranch West Pasture and Olema Marsh, respectively. Potential monitoring and mitigation measures would be identical to those described under Alternative A.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative C.

Conclusions: Alternative D would have very similar moderate beneficial effects as Alternative C on risks to public health in the local community associated with breeding of disease vectors such as mosquitoes in the Project Area. Most of these benefits would result from decreasing the extent of seasonally flooded grasslands in the Giacomini Ranch through reintroduction of tidal flushing and conversion to salt marsh and from discontinuation of agricultural management practices such as irrigation and ditching. Conversion to salt marsh would be expected to reduce, if not eliminate, breeding of mosquitoes, with the highest benefits coming from well-draining, fast-moving tidal creeks and low intertidal and very high vegetated intertidal elevation marsh "zones." Excavation of the southwestern portion of the East Pasture to lower intertidal elevations would increase the frequency of tidal inundation in this area relative to Alternative C. Portions of mid-marsh "zones"

or marshplains that are not regularly inundated by tides, but receive infrequent tidal inundation, may continue to provide breeding habitat for mosquitoes, particularly saltmarsh mosquitoes of the genus, *Ochlerotatus*, such as *Ochlerotatus squamiger*. While *O. squamiger* is known to transmit certain strains of encephalitis, it is not a documented carrier of West Nile Virus. Reconnection of the expanded East Pasture Old Slough and Fish Hatchery Creek to Lagunitas Creek would increase the diversity and number of estuarine fish predators. Improved connection between Project Area creeks and restoration of natural tidal marsh conditions is expected to reduce stagnant water in the Project Area, thereby limiting potential mosquito breeding areas.

In addition, under this alternative, hydraulic connectivity and drainage within Olema Marsh would be improved through an adaptive restoration approach that would result in dramatically lower water surface levels relative to baseline conditions, although, ultimately, continued inflow from permanent freshwater sources would continue to create breeding conditions for mosquitoes over the long-term, leading this alternative to have only minor beneficial effects on mosquito breeding conditions in this particular portion of the Project Area. Overall, this alternative would be expected to reduce habitats with the highest potential for supporting mosquito breeding by almost 83 percent, although mosquitoes would continue to reproduce in lower numbers within both the Giacomini Ranch and Olema Marsh. These beneficial effects would be expected to offset any increase in mosquito breeding habitat that results from creation of approximately 2 acres of seasonally flooded freshwater marsh ponds in the adjacent Olema Creek watershed as mitigation for impacts to California red-legged frog.

Construction-related activities such as installation of coffer dams to dewater construction areas could temporarily create impounded water conditions that could promote mosquito breeding. In addition, muted tidal or impounded freshwater conditions would continue to persist in portions of the Giacomini Ranch West Pasture and Olema Marsh, respectively. The Park Service would institute mitigation measures to minimize impacts, including limiting the duration of impoundment during construction, monitoring during construction, and treating, if necessary, with Bacillus thuringensis (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable and does not have measurable effects on other species. Also, the Park Service may monitor or contract for monitoring of permanently impounded areas that could increase the potential for mosquito breeding, although treatment would be conducted by the Park Service.

Public Services – Municipal Water Supply and Distribution

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Federal and state regulations and policies protect both the supply and quality of drinking water for the public. The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. SDWA authorizes the USEPA to set national health-based primary standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water, including by-products of the water treatment or disinfection process such as chlorites. Within California, the authority for implementation of the SDWA has been delegated to the California Department of Health Services (DHS). The California Safe Drinking Water Act (CA SDWA) was passed to build on and strengthen the federal SDWA. In addition to strengthening primary standards through the CA SDWA, DHS has also set secondary drinking water standards and maximum contaminant levels for analytes or contaminants of lesser concern that affect the taste, odor, or appearance of drinking water such as chlorides.

Protection of safe drinking water supplies also occurs through the Porter-Cologne Act. Water quality control plans designate beneficial uses of water for specific water bodies, establish water quality objectives to protect those uses, and provide a program to implement the objectives: one of those beneficial uses for Lagunitas Creek is municipal and domestic water supply. Through CEQA review, Marin County also regulates activities that substantially degrade or deplete groundwater resources, interfere with groundwater recharge, substantially degrade surface or groundwater quality, or substantially reduce the amount of water otherwise available for public water supplies.

Water districts are required by law to provide safe drinking water for customers. USEPA and DHS recently established disinfection by-product levels in potable water as a primary drinking water standard. Chloride levels are set as a secondary drinking water standard. DHS has set the maximum contaminant level (MCL) for disinfection by–products such as chlorites at 1.0 mg/L (DHS 2006). DHS has established the recommended MCL for chloride at 250 mg/L, with the upper MCL set at 500 mg/L and the short-term MCL set at 600 mg/L

(DHS 2003). A chloride concentration of 250 mg/L is considered the taste threshold for most people, however, often people can taste levels as low as 100 mg/L (NMWD 1997). NMWD has established 100 mg/L as its taste and odor threshold (NMWD 1997).

General Assumptions and Methodologies

- NMWD currently obtains its water supply for the Point Reyes Station service area from two groundwater wells located along Lagunitas Creek on the U.S. Coast Guard (USCG) property in Point Reyes Station (Figure 37).
- NMWD supplies water to its customers using a network of pipelines, which are either buried belowground or suspended below bridges. There are no water collection, treatment, or storage facilities within the Project Area, but some of distribution pipeline systems are present.
- Water districts are required by law to provide safe drinking water for customers. DHS has established primary drinking water standards for disinfection by-products such as chlorites (MCL = 1.0 mg/L) and secondary drinking water standards for chlorides (MCL 250-600 mg/L). NMWD has established 100 mg/L as its threshold for chlorides.
- NMWD has experienced episodes of elevated chlorides in its two groundwater wells since 1976. NMWD has implemented off-tide pumping practices to reduce potential for salinity intrusion into the Coast Guard Wells.
- These episodes of elevated chlorides sometimes increase chlorides to levels that exceed NMWD thresholds, as well as recommended or upper MCLs established by DHS.
- Through increasing the extent of tidally influenced areas and replacing culverts, the proposed project has the potential to affect both distribution and supply of municipal water.

Chlorides occur in waters derived from both marine and terrestrial sources such as surface waters (fluvial or creek, run-off, etc.) and groundwater, with mineral content of terrestrial sources determined by weathering of rocks native to the area. While there has been a considerable amount of study into the salinity intrusion problem, the exact cause or mechanisms by which salinities become elevated is still not totally understood. However, it is safe to assume that the system involves both surface water-recharge of alluvial aquifers with tidally influenced and non-tidally influenced waters in Lagunitas Creek, as well as, to some degree, lateral or horizontal inflow from the terrace groundwater aquifer, which has also been shown to be elevated in chlorides (KHE 2006a; Questa 2000).

The NMWD has documented salinity intrusion events in their Coast Guard well facility dating back to 1976. With the mandated removal of the Giacomini summer dam, beginning in 1997, the potential for, and frequency of salinity intrusion events increased at the Coast Guard well facility. In response, NMWD has operated under an off-tide pumping regime. The off-tide pumping regime avoids pumping for 6 hours around a predicted tide of 6 feet MLLW or greater (3 hours before and 3 hours after predicted peak). Continuous water level monitoring in the reach of Lagunitas Creek near the Coast Guard wells during fall 2005 showed, however, that salts are quickly flushed out of the creek once tides recede, lowering salinities down to freshwater levels (KHE 2006a). The implementation of the off-tide pumping regime is storage- and demand-dependent. Based on NMWD data, with implementation of the off-tide pumping practices, there have been a few periods since 1997 in which the salinity intrusion threshold of 100 mg/L either came very close to being exceeded (>90 mg/L; August 2001, October 2002 June 2003) or was exceeded (>100 mg/L; November – January 2003; July – September 2004; NMWD, unpub. data). There were no salinity intrusion events in 2005 or 2006 as of September 2006.

Salinity intrusion events during which NMWD experience chlorides exceeding 100 mg/L appear to correlate with predicted tide elevations exceeding 5.9 to 6.0 feet MLLW, although continuous conductivity monitoring suggests that changes in salinity occur with tides as low as 5.5 to 5.7 feet MLLW (NMWD 1997, NMWD, unpub. data). Preliminary conclusions by KHE (2006a) identify additional factors and conditions that are generally correlated with salinity spike occurrences in the Coast Guard Wells:

1) Periods of low flows less than 9-10 cfs;
2) Periods of maximum well-pumping rates (summer-time pumping rates);
3) Spring tides exceed 5.5 - to 5.7 feet MLLW (even though higher salinity waters reach the vicinity of the Coast Guard wells when predicted tides at Inverness are as low as 4.8 to 5.0 feet MLLW).
4) Spikes typically show up in the wells approximately 5- 10 days after a 5.5 to 5.7 feet MLLW spring or high tide event, typically during a neap or low tide event;

5) The spikes typically manifest as a single peak regardless of the number of days of high tide events the previous week;

While the exact location at which tidally and non-tidally influenced surface waters infiltrate into the alluvial aquifer is unknown, a review of available data and information on stratigraphy and creek bathymetry in the vicinity of the Coast Guard wells, predicted tide "thresholds" at which increases in groundwater salinity occur, and the consistent 5- to 7-day lag time between high tide- and intrusion events point to the infiltration location being some distance upstream from the Coast Guard wells (KHE 2006a). One of the possible infiltration locations could be the Downey well, which was originally constructed in the active floodplain of Lagunitas Creek in 1977, but has since become located in the middle of Lagunitas Creek due to subsequent migration or movement of the channel. This shallow well has not surprisingly had numerous operational problems during its life (NMWD 1997). Currently, this well is only being used during the summer and early fall to provide the Giacominis with irrigation water. Its location and operation suggest that the Downey well could be at least one of the major infiltration points for tidally influenced waters into the alluvial aquifer.

Ultimately, salinity intrusion appears to be controlled by a combination of factors, including tidal height, streamflow discharge, pumping rates, and possible influence from the adjacent terrace groundwater aquifer (KHE 2006a). A more detailed description of current theories regarding salinity intrusion can be found in Chapter 3 under Public Services – Municipal Water Supply and Distribution.

Effects of the Proposed Project on Municipal Water Supply: The proposed project would restore natural tidal and freshwater hydrologic processes. It has the potential of both increasing tidal prism in southern Tomales Bay by removing levees on the Giacomini Ranch and improving hydraulic connectivity with Olema Marsh and increasing freshwater flow by designating the appropriative water right purchased from the Giacomini Trust for beneficial in-stream uses. Because the exact mechanism by which salinity intrusion occurs is not understood, it is important that this document incorporate the most relevant impact indicator for analysis.

Restoring tidal hydrologic processes may affect surface water recharge of the alluvial aquifer in three ways: 1) increases in the **duration** or amount of time that saltwaters remain in the creek where infiltration into the alluvial aquifer occurs; 2) **frequency of intrusion events unrelated to changes in volume of saltwater** through either changes in streamflow (freshwater) discharge or removal of in-stream tide barriers such as gravel bars or debris jams that could change the predicted tide elevation under which tidal waters reach well recharge area (currently, changes in salinity occur with tides as low as 5.5 to 5.7 feet MLLW; NMWD 1997, NMWD, unpub. data).); and/or 3) **frequency of intrustion events related to changes in volume of saltwater** or changes in the volume of salts during spring tide events, thereby potentially changing the frequency by changing the threshold tide level at which problematic volumes of salts develop. Evaluation of the monitoring data related to the NMWD Coast Guard well site indicate that the saltwaters introduced by high tides are rapidly flushed out once high tides have passed, even during the summer. Modeling results do indicate potential change in the chloride load within the water adjacent to the Coast Guard well site in association with different restoration alternatives. It should be noted that these results did not incorporate the off-tide pumping practices employed by NMWD. As described above, these practices are generally effective at preventing occurrences of chlorides reaching the Coast Guard Wells.

For this document, analysis of the potential for the proposed project to increase the volume of salts in upstream portions of Lagunitas Creek was based on the results of computer hydrodynamic models that assessed changes in surface water salinity in Lagunitas Creek at the Coast Guard wells during peak high tides under the various alternatives (Table 82). Because most of the potential salinity intrusion events occur during the summer or fall, the model was specifically calibrated to represent a mean tidal month during the summer with characteristic high or spring tides that exceeded 5.5 feet MLLW, reaching more than 6 feet MLLW on several occasions, and mandated minimum summertime stream discharge for both 1) normal (8 cfs) and 2) dry (6 cfs) years. Dry-year flow conditions also assume minimal inflow from tributaries to Lagunitas Creek, including Olema and Bear Valley Creek. This particular hydrodynamic model uses a depth-averaged process for salinity results. Because the Coast Guard well location on Lagunitas Creek represented the extreme end of the modeling frame, there was some disparity during calibration runs between expected and observed salinities, however, numbers fell within the range of acceptable tolerance limits. The differences between observed and expected varied depending on the tide, but, during some of the higher tides, the model underestimated observed salinities in Lagunitas Creek by approximately 0.14 ppt (~5 mg/L) to 0.35 ppt (~12 mg/L; KHE 2006a).

The total mass of salts or chlorides occurring in upstream portions of Lagunitas Creek under existing conditions and the various alternatives was calculated as average salinity concentration (mg/L) by summing the mass of chlorides expected to be present on tides greater than 5.5 feet MLLW (relative to Inverness predicted tides) during the second half of the summer Mean Tidal Month within a defined 330-foot cross-sectional area adjacent to the Coast Guard wells under both 1) dry-year (6 cfs) and 2) normal-year flows (8 cfs). The predicted average concentration of salts or chlorides during these events under baseline conditions was estimated at 700 mg/L during normal-year flows and almost 1,700 mg/L during dry-year flows (KHE 2006a; Table 84). For the FEIS/EIR, thresholds were adjusted slightly such that increases and decreases in salinity concentration are evaluated using the same ranges, because decreases in average salinity are likely to have as much a positive effect on the alluvial aquifer as increases in average salinity would potentially have a negative effect. In addition, as referenced above, thresholds now include both normal- and dry-year flows. The effects of increases or decreases are evaluated relative to potential effect on municipal water supply operations.

TABLE 82. PUBLIC SERVICES – MUNICIPAL WATER SUPPLY AND OPERATIONS

Source: Safe Water Drinking Act (SDWA), CA SDWA, Porter-Cologne Act, Marin CWP **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Long-Term	
No Impact	There would be no potential for impact to municipal groundwater supply associated with the proposed project.
Negligible	There would be the potential for a barely detectable effect on municipal water supply operations by changing the average concentration of salts or chlorides (≤ 2 percent) during spring or high tide conditions (>5.5 feet MLLW) in upstream areas of Lagunitas Creek adjacent to the Coast Guard wells associated with the proposed project during normal and dry-year flow conditions. This would have the potential for a barely detectable effect on municipal water supply operations.
Minor	There would be the potential for a measurable effect on municipal water supply operations by changing the average concentration of salts or chlorides (> 2 percent and ≤ 5 percent) during spring or high tide conditions (>5.5 feet MLLW) in upstream areas of Lagunitas Creek adjacent to the Coast Guard wells associated with the proposed project during normal- and dry- year flow conditions. This would have the potential for a barely detectable to measurable effect on municipal water supply operations.
Moderate	There would be the potential for an appreciable effect on municipal water supply operations by changing the average concentration of salts or chlorides (> 5 percent and ≤ 15 percent) during spring or high tide conditions (>5.5 feet MLLW in upstream areas of Lagunitas Creek adjacent to the Coast Guard wells associated with the proposed project during normal- and dry-year flow conditions. This would have the potential for an appreciable effect on municipal water supply operations.
Major or Substantial	There would be the potential for a major effect on municipal water supply operations by changing the average concentration of salts or chlorides (> 15 percent) during spring or high tide conditions (>5.5 feet MLLW in upstream areas of Lagunitas Creek adjacent to the Coast Guard wells associated with the proposed project during normal- and dry- year flow conditions. This would have the potential for a major or substantial effect on municipal water supply operations.

Impact Analysis

TABLE 83. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR PUBLIC SERVICES – MUNICIPAL WATER SUPPLY AND DISTRIBUTION

All impacts would be considered Local Community and Construction or Short-Term/Long-Term, as specified. Where differences exist between impacts for average- and dry-year flows, impacts are displayed as Average Year/Dry Year.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Municipal Water Supply Operations	Beneficial - Major	Beneficial - Moderate	Beneficial - Moderate	Adverse – Major	Adverse – Major
NEPA: Intensity Following Mitigation				Adverse – Minor	Adverse – Minor
CEQA: Significance Following Mitigation				Less than Significant	Less than Significant
Municipal Water Supply Distribution	No Impact	No Impact	No Impact	Adverse – Minor	Adverse – Minor

TABLE 84. HYDRODYNAMIC MODELING RESULTS FOR AVERAGE SALINITY CONCENTRATIONS IN LAGUNITAS CREEK (KHE 2006A).

Estimated average concentration of chlorides during spring or high tide conditions (>5.5 feet MLLW) relative to predicted tides at Inverness) in 330-foot section of Lagunitas Creek adjacent to Coast Guard wells associated with the proposed project during normal- and dry- year flows.

Flow Conditions	Average Chloride Concentrations (mg/L)					
	Existing Conditions	No Action	Alternative A	Alternative B	Alternative C[2]	Alternative D[2]
Average (8 cfs)	700	417	601	602	1551	1551
Percent Change Relative to Existing Conditions		-40	-14	-14	+121	+121
Dry (6 cfs)[1]	1692	1066	1446	1448	3689	3689
Percent Change Relative to Existing Conditions		-37	-14	-14	+118	+118

[1] Hydrodynamic modeling analyses for dry-flow conditions also assume minimal or dry-year instream flow conditions in Olema and Bear Valley Creeks, which join Lagunitas Creek in the Project Area downstream of the Coast Guard wells.
[2] Alternatives C and D take into account potential subsidence of Olema Marsh with restoration.

No Action Alternative

Analysis: The No Action Alternative would have major beneficial effects on municipal water supply by reducing salinities within upstream portions of Lagunitas Creek during high tides, which could result in a beneficial effect on municipal water supply operations (Table 83). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities. The largest relevant change under the No Action Alternative comes with expiration of the Reservation of Use agreement with the Giacomini Trust in March 2007 and discontinuation of active agricultural management and management practices, particularly irrigation.

With expiration of the Reservation of Use agreement, the Park Service would follow its stated intention at the time of purchase to re-designate the purchased appropriative water right on Lagunitas Creek, which has been used for irrigation since 1959, for beneficial in-stream uses under State Water Code 1707. Under the No Action Alternative and all the action alternatives, the Park Service as the new owner would discontinue water diversion from the Downey Well and re-designate the 2.0 cfs of Lagunitas Creek streamflow for beneficial instream uses, including fish resources such as central California coast coho salmon (*Oncorhynchus kisutch*; FE), central California coastal steelhead (*Oncorhynchus mykiss*; FE), and California coastal chinook salmon (*Oncorhynchus tshawytscha*; FT). The remaining 0.67 cfs under this appropriative water right was purchased by NMWD for municipal water supply purposes. During the summer, NMWD has been providing the Giacomini Ranch with irrigation waters pumped from the Downey Well as part of its purchase agreement with the Giacomini Trust: this agreement is set to expire in July 2008. Under this agreement, NMWD is obligated to supply the Giacomini Ranch up to 1.23 cfs per summer season, although deliveries typically average closer to 1 cfs (C. DeGabriele, NMWD, *pers. comm*.). The Giacominis have continued to retain rights for up to 2 cfs and have sometimes pumped directly from Lagunitas Creek to augment supply from the Downey Well.

By ending irrigation and re-designating 2.0 cfs for beneficial in-stream flow, NMWD would indirectly benefit through an increase in freshwater streamflow or discharge that flows down the reach of Lagunitas Creek upstream of the Green Bridge during the summer. While the relationship between surface flows and the groundwater supply is not well understood, an increase in stream discharge directly within the well intake area could have several beneficial effects. Salts carried by some of the spring tides would be further diluted relative to baseline conditions by the greater volume of freshwater flow, thereby decreasing the volume of salts that infiltrate into the alluvial aquifer during these higher high tide events. Based on hydrodynamic modeling of both average (8-cfs) and dry (6 cfs) instream flows as mandated by the SWRCB[3], the No Action Alternative would potentially decrease average salinity or chloride concentrations during spring or high tide

[3] Measurement of mandated instream flows to be provided by Marin Municipal Water District (MMWD) through reservoir releases occurs at Samuel P. Taylor State Park, more than 7 miles upstream of the Coast Guard Wells.

conditions (>5.5 feet MLLW) in Lagunitas Creek adjacent to the NMWD Coast Guard wells by as much as 37-41 percent relative to simulated average salinity concentrations during dry-year and normal-year streamflow scenarios, respectively, for baseline conditions, where average chloride concentrations ranged from approximately 700 to 1,692 mg/L (KHE 2006a; Table 84). While the Giacominis only use irrigation waters during the summer and late fall, these months represent the exact period when salinity intrusion events are the most common, even though some of the highest high tides occur during the winter.

This drop in average salinity or chloride concentration during spring or high tide conditions (>5.5 feet MLLW) of Lagunitas Creek streamflows could reduce impacts to operations from salinity intrusion events, although the magnitude of this reduction cannot be predicted with the current level of information on the relationship between salinities of surface waters and groundwater. Currently, NMWD attempts to avert salinity intrusion events by conducting off-tide pumping or reduced pumping such that at least one of the two wells at the Coast Guard station is turned off when predicted tides at Inverness reach 5.9 to 6.0 feet MLLW. Salt concentrations in the creek would be reduced relative to baseline conditions, thereby decreasing the volume of salts infiltrating into the alluvial aquifer. Decreasing the volume of salts conveyed upstream on high tides could reduce the frequency of salinity intrusion events by making it such that a higher tide or series of higher tide events (i.e., 6.2 feet MLLW) would be required to not only reach the point at which chlorides enter the alluvial aquifer, but produce the minimum chloride volume needed to trigger such an event. The time needed for freshwater recharge to reduce the volume of salts in the alluvial aquifer once high tides have passed could also decrease, particularly when pumping rates are high. All of these factors would be expected to have a beneficial effect on municipal water supply operations by potentially reducing the need for or frequency of off-tide pumping currently conducted by NMWD.

Use of the Downey well would be discontinued once its contract with the Giacomini Ranch for provision of irrigation waters ends. The effect that decommissioning of the well might have cannot be predicted with available information, but it is directly correlated with the re-designation of the appropriated water right.

Over the long term, the benefits of the No Action Alternative have to be considered in the overall context of large-scale trends in climatic change, such as global warming and sea level rise. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could alter the frequency, duration, and chloride concentration adjacent to the Coast Guard Wells, regardless of which alternative is implemented.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There is one proposed project that could have cumulative impacts on municipal water supply. NMWD is evaluating means of improving water supply reliability within the area. NMWD has developed a well at the Gallagher Ranch, upstream of the Coast Guard wells, that could be used during high tide periods when one of the Coast Guard wells is typically shut down to avoid salinity intrusion events. The intent of the auxiliary well is not to expand the volume of water withdrawn from the groundwater, but maintain existing withdrawal rates during high tide events. NMWD is currently seeking funds for this proposed project. In combination with management actions proposed under the No Action Alternative and all action alternatives, these projects would still be expected to have a moderate to major effect on reducing salinities within upstream portions of Lagunitas Creek that could affect the quality of municipal water supply for the local community, though potential implications of sea level rise could eliminate all potential cumulative benefits.

Conclusions: The No Action alternative would potentially have major beneficial effects on municipal water supply operations by dramatically reducing average salinities in upstream portions of Lagunitas Creek during high tides. Closure of the Downey Well and dedication of the 2.0 cfs of an appropriative water right on Lagunitas Creek to in stream flow would increase existing summer base flows up to 20 percent through the Coast Guard Wells and Project Area. Based on hydrodynamic modeling, the increase in instream flow during the summer months could result in anywhere from a 37 to 41 percent decrease in average salinity or chloride concentrations during spring or high tide conditions (>5.5 feet MLLW) in the portion of Lagunitas Creek directly adjacent to the Coast Guard wells during dry-year (6 cfs) and normal-year (8 cfs) mandated instream flow regimes, respectively, relative to baseline conditions (KHE 2006a; Table 84). The rate of increase is slightly less under dry-flow conditions, because salinities are already higher. Closure of the Downey Well

would also eliminate one of the potential areas in which tidally influenced waters infiltrate into the alluvial aquifer. Relative to baseline conditions, the increased volume of freshwater inflow would reduce salt concentrations in surface flows during spring tide events and thereby potentially decrease the frequency of salinity intrusion events and the time needed for freshwater to recharge of the alluvial aquifer once high tides have passed. These factors would have a beneficial effect on municipal water supply operations by potentially reducing the need for or frequency of off-tide pumping currently conducted by NMWD. There would be no effect on municipal water supply distribution.

Alternative A

Analysis: Alternative A would have moderate beneficial effects on municipal water supply by reducing salinities within upstream portions of Lagunitas Creek during high tides, which could potentially result in a beneficial effect on municipal water supply operations (Table 83). Under Alternative A, only the East Pasture would be restored. There would be no restoration in the West Pasture or Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would be retained. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways in addition to discontinuation of agricultural management practices such as irrigation. Public access facilities proposed under Alternative A would not affect water supply issues associated with the project.

Municipal Water Supply: With expiration of the Reservation of Use agreement, the Park Service would follow its stated intention at the time of purchase to re-designate the purchased appropriative water right on Lagunitas Creek, which has been used for irrigation since 1959, for beneficial in-stream uses under State Water Code 1707. Under the No Action Alternative and all the action alternatives, the Park Service as the new owner would discontinue pumping from the Downey Well and re-designate the 2.0 cfs of Lagunitas Creek streamflow for beneficial instream uses, including fish resources such as central California coast coho salmon (*Oncorhynchus kisutch*; FE), central California coastal steelhead (*Oncorhynchus mykiss*; FE), and California coastal chinook salmon (*Oncorhynchus tshawytscha*; FT). Discontinuation of Downey Well operations would increase the volume of freshwater flowing down the portion of Lagunitas Creek upstream of the Green Bridge during the summer.

Under Alternative A, the beneficial effects of increasing instream freshwater flow are tempered to some degree by an increase in tidal prism within the Project Area resulting from selective breaching of the East Pasture levee. Tidal prism – or the volume of water exchanged through tidal action on a daily basis – would increase from 8.1 acre-feet under baseline conditions to approximately 235.4 acre-feet under Alternative A (KHE 2006a). The extent of area inundated by tides on a daily basis would climb from approximately 11.0 acres under baseline conditions to approximately 200 acres under Alternative A, with all of the increase occurring in the approximately 350-acre East Pasture of the Giacomini Ranch (KHE 2006a). Most of the tidal exchange in the Giacomini Ranch would occur within the lower-elevation northern portion of the East Pasture, where marshplain elevations are lowest, and the primary tidal creek inlet would be located. These areas are almost 2- 2.75 miles downstream of the Coast Guard wells. The southernmost portions of the East Pasture near White House Pool are well above intertidal elevations and would only be subject to tidal action during extreme high tides and/or flood events.

This increase in the volume of saltwater moving in and out of the southern portion of Tomales Bay has implications for salinities or concentrations of salts in Lagunitas Creek upstream of the Project Area. Based on results of hydrodynamic modeling, the reintroduction of tidal action to the East Pasture would reduce the magnitude or degree of dilution in salinities or concentrations of chlorides in upstream reaches of Lagunitas Creek that transfer of the appropriative water right from irrigation to beneficial in-stream uses would have provided. Under Alternative A, concentrations of chlorides as simulated by hydrodynamic modeling would potentially drop from 14 percent within the creek during spring tides in the summer and early fall under both average (8 cfs) and dry-year (6 cfs) streamflow conditions, respectively, relative to baseline conditions (KHE 2006a; Table 84). Dry- year flow conditions take into account minimal or dry-year flow conditions in unregulated creeks, as well, such as Olema and Bear Valley Creeks, which join with Lagunitas Creek within the Project Area downstream of the Coast Guard wells. These results suggest that, even with increased volume of saltwater in the southern portion of Tomales Bay, the East Pasture is capable of absorbing most of these waters, thereby maintaining a considerable portion of the benefits to reduced creek salinities provided by re-designation of the appropriative water right.

These hydrodynamic modeling results suggest that Alternative A could have similar beneficial effects on municipal water supply operations, although lower in magnitude than the No Action Alternative. Salt concentrations in the creek would be reduced relative to baseline conditions, thereby decreasing the volume of salts infiltrating into the alluvial aquifer. Currently, Currently, NMWD attempts to avert salinity intrusion events by conducting off-tide pumping or reduced pumping such that at least one of the two wells at the Coast Guard station is turned off when predicted tides at Inverness reach 5.9 to 6.0 feet MLLW. Decreasing the volume of salts conveyed upstream on high tides could reduce the frequency of salinity intrusion events by making it such that a higher tide or series of higher tide events (i.e., > 5.7 feet MLLW) would be required to not only reach the point at which chlorides enter the alluvial aquifer, but produce the minimum chloride volume needed to trigger such an event. The time needed for freshwater recharge to reduce the volume of salts in the alluvial aquifer once high tides have passed could also decrease, particularly when pumping rates are high. All of these factors could potentially have beneficial effects on municipal water supply operations by decreasing the need for or frequency of off-tide pumping currently conducted by NMWD relative to existing conditions.

Over the long term, the benefits of the No Action Alternative have to be considered in the overall context of large-scale trends in climatic change, such as global warming and sea level rise. Recently published studies suggest that sea level rise rates may be much greater than originally predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006). This rate of sea level rise could alter the frequency and duration of tides causing salinity intrusion into the alluvial aquifer, as well as the overall chloride concentrations adjacent to the Coast Guard Wells, regardless of the proposed project alternative.

Municipal Water Supply Distribution: There would be no effect on municipal water supply distribution.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under the No Action Alternative.

Conclusions: Alternative A would potentially have moderate beneficial effects on municipal water supply by reducing average salinity concentrations in Lagunitas during high tides, which could potentially have a beneficial effect on municipal water supply operation. Discontinuation of Downey Well pumping and dedication of the 2.0 cfs appropriative water right to in-stream beneficial use will ensure increased freshwater flow through the Coast Guard Well and Green Bridge. Under Alternative A, tidal prism would increase with breaching of the East Pasture levee, which would somewhat offset the benefits provided by increased volume of freshwater in-stream flow to some degree. Based on hydrodynamic modeling, average salinity or chloride concentrations could drop to between 14 percent during spring or high tide conditions (>5.5 feet MLLW) in the portion of Lagunitas Creek directly adjacent to the Coast Guard wells during SWRCB dry-year (6 cfs) and normal-year (8 cfs) streamflow regimes (KHE 2006a; Table 84). elative to baseline conditions, the increased volume of freshwater inflow would reduce salt concentrations in surface flows during spring tide events and thereby potentially decrease the frequency of salinity intrusion events and the time needed for freshwater to recharge of the alluvial aquifer once high tides have passed. These factors would have a beneficial effect on municipal water supply operations by potentially reducing the need for or frequency of off-tide pumping currently conducted by NMWD. There would be no effect on municipal water supply distribution.

Alternative B

Analysis: As described in Alternative A, Alternative B would have moderate beneficial effects on municipal water supply by reducing average salinities within upstream portions of Lagunitas Creek during high tides, which could result in a beneficial effect on municipal water supply operations (Table 83). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. Some connection would be established between the East Pasture and Tomasini Creek through lowering of levees to allow overflow during flood events, but otherwise Tomasini Creek would remain in its current channel with tidegate/flashboard dam structure still in place. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure

and discontinuation of agricultural management practices such as irrigation. Public access facilities proposed under Alternative B would not affect water supply issues associated with the project.

Municipal Water Supply: While tidal influence would be reintroduced to the West Pasture with breaching of the levees, the increase in tidal prism would be so minimal relative to Alternative A – approximately 6.3 acre-feet – that there would be no to only very negligible differences between Alternatives A and B in terms of average salinity concentrations in upstream portions of Lagunitas Creek (KHE 2006a; Table 84). As with Alternative A, most of the tidal exchange between Lagunitas Creek/Tomales Bay and the Giacomini Ranch would continue to occur within the northern portions of the ranch, almost 2- 2.75 miles downstream of the Coast Guard wells. Based on hydrodynamic modeling, average salinity or chloride concentrations could be reduced 14 percent during spring or high tide conditions (>5.5 feet MLLW) in the portion of Lagunitas Creek directly adjacent to the Coast Guard wells during both dry-year (6 cfs) and normal-year (8 cfs) streamflow regimes mandated by the SWRCB, respectively, relative to baseline conditions (KHE 2006a; Table 84). Modeling results suggest that due to proximity, the East Pasture has a much stronger influence on salinity dynamics and patterns in Lagunitas Creek above the Green Bridge than the West Pasture.

These hydrodynamic modeling results suggest that Alternative B could have similar beneficial effects on municipal water supply operations as Alternative A, although both would be lower in magnitude than the No Action Alternative. Salt concentrations in the creek would be reduced relative to baseline conditions, thereby decreasing the volume of salts infiltrating into the alluvial aquifer. Currently, Currently, NMWD attempts to avert salinity intrusion events by conducting off-tide pumping or reduced pumping such that at least one of the two wells at the Coast Guard station is turned off when predicted tides at Inverness reach 5.9 to 6.0 feet MLLW. Decreasing the volume of salts conveyed upstream on high tides could reduce the frequency of salinity intrusion events by making it such that a higher tide or series of higher tide events would be required to produce the minimum volume of salt needed to trigger such an event. The time needed for freshwater recharge to reduce the volume of salts in the alluvial aquifer once high tides have passed could also decrease, particularly when pumping rates are high. All of these factors could potentially have beneficial effects on municipal water supply operations by decreasing the need for or frequency of off-tide pumping currently conducted by NMWD relative to existing conditions.

Over the long term, the benefits of Alternative B have be considered in the overall context of large-scale trends in climatic change, such as global warming and sea level rise, which would alter the frequency and duration of tides causing salinity intrusion into the alluvial aquifer, as well as the overall chloride concentrations in surface waters of Lagunitas Creek, regardless of the proposed project alternative.

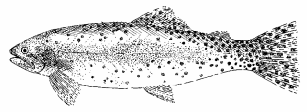
Municipal Water Supply Distribution: There would be no effect on municipal water supply distribution.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as discussed under the Alternative A.

Conclusions: As with Alternative A, Alternative B would potentially have moderate beneficial effects on municipal water supply by salinities within upstream portions of Lagunitas Creek during high tides, which could result in a beneficial effect on municipal water supply operations. Discontinuation of Downey Well pumping and dedication of the 2.0 cfs appropriative water right to in-stream beneficial use will ensure increased freshwater flow through the Coast Guard Well and Green Bridge. Under Alternative A, tidal prism would increase with breaching of the East Pasture levee, which would somewhat offset the benefits provided by increased volume of freshwater in-stream flow to some degree. Based on hydrodynamic modeling, average salinity or chloride concentrations could drop to between 14 percent during spring or high tide conditions (>5.5 feet MLLW) in the portion of Lagunitas Creek directly adjacent to the Coast Guard wells during SWRCB dry-year (6 cfs) and normal-year (8 cfs) streamflow regimes (KHE 2006a; Table 84). Increased freshwater between the Downey Well and Coast Guard Wells, in conjunction with NMWD off-tide pumping practices, would reduce or dilute the volume of salts introduced into the alluvial aquifer and potentially decrease the frequency of salinity intrusion events and the need for NMWD to conduct off-tide or reduced pumping during high tide events. There would be no effect on municipal water supply distribution.



Alternative C

Analysis: Alternative C would have appear to have the potential for major or substantial adverse effects on municipal water supply operations by increasing salinities within upstream portions of Lagunitas Creek during high tides, which could result in an adverse effect on municipal water supply operations (Table 83). These major or substantial adverse effects on municipal water supply would constitute a significant impact under CEQA, however, they would be mitigated to negligible adverse under NEPA and less-than-significant under CEQA through the proposed mitigation measures identified below. Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. A small tidal channel would be initiated off Lagunitas Creek, as well as in the interior of the East Pasture. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices such as irrigation. Public access facilities proposed under Alternative B would not affect water supply issues associated with the proposed project.

Municipal Water Supply: Unlike the other alternatives, Alternative C may cause a net increase in average salinity or chloride concentrations during high or spring tide events in the portion of Lagunitas Creek adjacent to the Coast Guard wells during both dry-year and normal-year streamflow scenarios based on results of hydrodynamic modeling (KHE 2006a). Modeling results suggest that average chloride concentrations in this reach of Lagunitas Creek would increase by 121 percent over baseline conditions during spring or high tide conditions (>5.5 feet MLLW) under normal-year flows and 118 percent under dry-year streamflow conditions, respectively (KHE 2006a; Table 84). Dry-year flow conditions take into account minimal or dry-year flow conditions in unregulated creeks, as well, such as Olema and Bear Valley Creeks, which join with Lagunitas Creek within the Project Area downstream of the Coast Guard wells. The rate of increase is slightly less under dry-flow conditions, because salinities are already higher.

The dramatic change in simulated salinities in upstream portions of Lagunitas Creek under Alternative C is associated with the inclusion of Olema Marsh in the restoration project. While Alternative C would involve complete removal of levees in the West Pasture, one of the primary drivers that influences the volume of saltwater that moves into upstream portions of Lagunitas Creek is tidal prism, and the volume of water exchanged with daily tidal action in the Giacomini Ranch under Alternative C would be identical to that of Alternative B (approximately 242 acre-feet; KHE 2006a). Inclusion of Olema Marsh into the restoration project only slightly increases tidal prism for the overall project. As noted above, Olema Marsh would be restored using an adaptive restoration approach that would involve removal of a sediment berm and shallow excavation of an improved flow path for Bear Valley Creek, as well as potentially replacement of one or both of the Levee Road and Bear Valley Road culverts. Combined, these adaptive restoration actions, along with subsidence of the Olema Marsh floodplain and introduction of tidal exchange upstream of Bear Valley Road, would be expected to increase the volume of water exchanged on spring or high tides to approximately 10- to 21 acre-feet depending on which actions are implemented (KHE 2006a).

The large effect that Olema Marsh has on salinity structure of upstream portions of Lagunitas Creek despite its relatively small tidal prism appears to relate to the location of its exchange point with Lagunitas Creek (KHE 2006a). The outlet of Bear Valley Creek, which flows through Olema Marsh, empties into a deep section of Lagunitas Creek upstream of White House Pool and approximately 1 mile downstream of the Coast Guard well site. Conversely, as discussed under Alternatives A and B, because the Giacomini Ranch delta is shaped like a wedge, with the highest elevations in the south, closest to the Coast Guard wells, and the lowest elevations in the north, furthest from the wells. Most of the tidal exchange for the Giacomini Ranch would occur in the lower-elevation northern portion where the mouths of tidal creek channels are located, and marshplain elevations are lowest and more subject to flooding by tides. These areas are almost 2- 2.75 miles downstream of the Coast Guard wells. The southernmost portions of the East Pasture near White House Pool are well above intertidal elevations and would only be subject to tidal action during extreme high tides and/or flood events.

While chloride concentrations and volume of chlorides predicted to occur adjacent to the Coast Guard wells would increase under Alternative C, this increase in chloride volume may not necessarily alter the threshold tide level at which salinity intrusion events would occur. Potential salinity intrusion may occur currently during

tides exceeding 5.7 feet MLLW for one of two reasons: a tide of this magnitude is required to generate the volume of salts that is problematic for water supply operations, or a tide of this magnitude is required to reach the portion of the creek where infiltration into the aquifer occurs. Because the potential for salinity intrusion does not appear to have a linear relationship with chlorides – that is, steadily increasing volume of salts in creek does not lead to a steady increase in salts in the groundwater well system – it would appear that the latter reason is a more likely explanation for the relationship of salinity intrusion to tidal magnitude. Therefore, the increased chloride volumes under Alternative C would not be expected to necessarily change in the frequency of salinity intrusion events. As they do currently, NMWD would continue to initiate off-tide pumping during tides exceeding 5.9- to 6.0 feet MLLW. However, higher chloride volumes could affect operations by potentially increasing the volume of salts in the alluvial aquifer and the time needed for freshwater recharge to reduce creek-derived chlorides within the aquifer. Mitigation measures have been proposed to preclude these impacts to municipal water supply operations or at least to reduce impacts to minor. This is described in better detail under Proposed Mitigation Measures below.

Over the long term, the potential impacts of Alternative C also have be considered in the overall context of large-scale trends in climatic change, such as global warming and sea level rise, which would alter the frequency and duration of tides causing salinity intrusion into the alluvial aquifer, as well as the overall chloride concentrations in surface waters of Lagunitas Creek, regardless of the proposed project alternative.

Municipal Water Supply Distribution: The NMWD distribution pipeline for Inverness Park, Silver Hills, and Bear Valley Road area follows State Route 1 to Levee Road, where it is buried or suspended on the north side of Levee Road until it reaches the intersection with Bear Valley Road. Potential replacement of the easternmost Levee Road culvert on Bear Valley Creek as part of the Olema Marsh restoration would likely require temporary disconnection of the pipeline, use of a temporary bypass, and replacement or relocation of a permanent pipeline once construction is completed. It is possible that the pipeline would be turned off during certain portions of the construction process, thereby temporarily cutting off service to NMWD customers in Inverness Park, Silver Hills, and Bear Valley Road areas. As discussed under BMPs in Chapter 2, customers in these areas would be notified of a possible disruption in service approximately one week prior to excavation near or replacement or movement of the pipeline. These construction-related distribution issues would represent a minor adverse effect on municipal water supply and distribution to the local community.

Proposed Mitigation Measures: Alternative C would appear to have the potential for major or substantial adverse effects under NEPA and a significant impact under CEQA on municipal water supply operations by increasing the need for, if not necessarily the frequency of, off-tide pumping. These impacts would be mitigated, however, to minor adverse under NEPA and less-than-significant under CEQA through mitigation measures identified below. Implementation of major restoration of Olema Marsh would likely result in increases of chloride concentration during spring or high tide events in the portion of Lagunitas Creek adjacent to the Coast Guard wells, but it would not increase the frequency or duration of salinity intrusion events. To mitigate the potential impacts to NMWD operations and the quality of the groundwater supply from restoration of Olema Marsh, major adaptive restoration elements in Olema Marsh would not be implemented unless: 1) monitoring and further investigation of the relationship between Lagunitas Creek and the alluvial aquifer suggest that increased surface water salinities would not pose a threat to the quality of the municipal water supply; 2) there is new information suggesting that restoration of Olema Marsh would not increase salinities or otherwise pose a threat to the quality of the municipal water supply; or 3) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. These major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements such that they would only be implemented if initial stage restoration elements did not achieve the desired degree of hydraulic connectivity between Olema Marsh and Lagunitas Creek.

Hydrodynamic modeling of changes in Lagunitas Creek salinities with implementation of some of the initial adaptive restoration elements showed much less dramatic changes in average salinity concentrations. Based on hydrodynamic modeling, removal of the berm at the outlet of Bear Valley Creek near Levee Road, along with shallow excavation of a more defined flow path, would result in a smaller tidal prism (10 acre-feet) and, therefore, less of an increase relative to the full adaptive restoration approach in upstream Lagunitas Creek salinities during spring or high tides exceeding 5.5 feet MLLW of 59 percent during average-year flow conditions, respectively (KHE 2006a). Through iterative hydrodynamic modeling runs, the Park Service, ACR, and CSLC would work with its hydrologic consultants to identify limited restoration actions that could be implemented without causing major impacts to upstream Lagunitas Creek salinities. This limited restoration actions could include excavation of a "notch" in the berm or removal of the berm without shallow excavation

of a flow path or vice versa. Should these actions be undertaken, the Park Service would commit to monitoring of salinities during spring or high tide conditions in Lagunitas Creek at the outlet of Olema Marsh and adjacent to the Coast Guard wells to assess how these actions influence Lagunitas Creek salinities.

As it has done throughout the planning process, the Park Service will continue to meet and work cooperatively with NMWD in trying to gain a better understanding of the dynamics of this complex hydrologic system and to ensure that there are more than negligible adverse impacts to municipal water supply operations from implementation of the proposed project. The Park Service will also continue to support NMWD in its efforts to develop increased water supply reliability through development of the Gallagher well or other options that would increasing water supply reliability to the to the West Marin Service Area.

Effectiveness of Proposed Mitigation Measures: Implementation of these mitigation measures is expected to be highly effective. Hydrodynamic modeling shows that restoration of Olema Marsh would be the component that would potentially have an adverse effect on upstream Lagunitas Creek salinities and, therefore, potentially the municipal groundwater supply. Adaptive restoration elements would not be implemented in Olema Marsh until the Park Service can reliably conclude that restoration would not affect the municipal water supply for the town of Point Reyes Station and surrounding communities.

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Conclusions: Alternative C would appear to have the potential for major or substantial adverse effects under NEPA and a significant impact under CEQA on municipal water supply operations. Modeling results suggest that average chloride concentrations in this reach of Lagunitas Creek would increase by 121 percent over baseline conditions during spring or high tide conditions (>5.5 feet MLLW) under normal-year flows and 118 percent under dry-year streamflow conditions, respectively (KHE 2006a; Table 84). As they do currently, NMWD's practice of off-tide pumping would avoid these higher chloride concentrations during tides greater than 5.9 – to 6.0 feet MLLW. Therefore, these impacts would not be expected to alter the quality of the municipal groundwater supply, but rather to affect operations in that it could increase the need for, if not the frequency of, off-tide pumping and the time and freshwater recharge needed to reduce creek-derived chlorides within the aquifer.

Potential impacts to municipal water supply operations would be mitigated to minor adverse under NEPA and less-than-significant under CEQA by not implementing adaptive restoration elements in Olema Marsh until the Park Service can reliably conclude that restoration of Olema Marsh would have no more than a minor adverse potential for affecting municipal water supply operations. The dramatic change in effect between Alternative C and other alternatives on salinity or chloride concentrations in upstream reaches of Lagunitas Creek appears to result from inclusion of Olema Marsh in the restoration project. While the Olema Marsh only increases the tidal prism -- one of the major factors driving the volume of saltwater in upstream reaches -- by 8 percent, the proximity of the Bear Valley Creek outlet and Olema Marsh to the Coast Guard well site (~1 mile) likely magnifies its effect on salinity structure on upstream reaches. Most of the tidal exchange between Lagunitas Creek/Tomales Bay and the Giacomini Ranch would continue to occur within the northern portions of the ranch, almost 2- 2.75 miles downstream of the Coast Guard wells.

To mitigate the potential impacts to NMWD operations and the quality of the groundwater supply from restoration of Olema Marsh, major adaptive restoration elements in Olema Marsh would not be implemented unless: 1) monitoring and further investigation of the relationship between Lagunitas Creek and the alluvial aquifer suggest that increased surface water salinities would not pose a threat to the quality of the municipal water supply; 2) there is new information suggesting that restoration of Olema Marsh would not increase salinities or otherwise pose a threat to the quality of the municipal water supply; or 3) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. These major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements such that they would only be implemented if initial stage restoration elements did not achieve the desired degree of hydraulic connectivity between Olema Marsh and Lagunitas Creek.

Through iterative hydrodynamic modeling runs, the Park Service, ACR, and CSLC would work with its hydrologic consultants to identify limited restoration actions that could be implemented without causing major or substantial impacts to upstream Lagunitas Creek salinities. This limited restoration actions could include excavation of a "notch" in the berm or removal of the berm without shallow excavation of a flow path or vice versa. The Park Service will continue to work cooperatively with NMWD to ensure that there are more than

minor adverse impacts to municipal water supply operations from implementation of the proposed project and to support NMWD in its efforts to develop increased water supply reliability through development of the Gallagher well. Should at some point in the future replacement of the Levee Road becomes feasible, construction would likely require temporary disconnection, establishment of a bypass, and later reconnection, which could result in a temporarily cut off of service to NMWD customers in Inverness Park, Silver Hills, and Bear Valley Road areas. This construction-related distribution issues would represent a minor adverse effect on municipal water supply and distribution to the local community.

Alternative D

Analysis: Alternative D would have the potential for identical minor to major adverse effects as Alternative C on municipal water supply operations and distribution to the local community (Table 83). Hydrodynamic modeling results show that excavation of the southern portion of the East Pasture to lower floodplain and intertidal marshplain elevations would not measurably affect estimates of the average salinity concentrations in upstream portions of Lagunitas Creek adjacent to the Coast Guard wells (KHE 2006a).

Proposed Mitigation Measures: Proposed mitigation measures would be the same as described under Alternative C.

Effectiveness of Proposed Mitigation Measures: The effectiveness of the proposed mitigation measures would be the same as described under Alternative C.

Cumulative Impacts: Cumulative impacts would be the same as discussed under Alternative A.

Conclusions: Similar to Alternative C, Alternative D would appear to have the potential for major or substantial adverse effects under NEPA and a significant impact under CEQA on municipal water supply operations. Potential impacts to municipal water supply operations would be mitigated to minor adverse under NEPA and less-than-significant under CEQA. Modeling results suggest that, under Alternatives C and D, average chloride concentrations in this reach of Lagunitas Creek would increase by 121 percent over baseline conditions during spring or high tide conditions (>5.5 feet MLLW) under normal-year flows and 118 percent under dry-year streamflow conditions, respectively (KHE 2006a; Table 84). As they do currently, NMWD's practice of off-tide pumping would avoid these higher chloride concentrations during tides greater than 5.9 – to 6.0 feet MLLW. Therefore, these impacts would not be expected to alter the quality of the municipal groundwater supply, but rather to affect municipal water supply operations in that it could increase the need for, if not the frequency of, off-tide pumping and the time and freshwater recharge needed to reduce creek-derived chlorides within the aquifer.

Potential impacts to municipal water supply operations would be mitigated by not implementing adaptive restoration elements in Olema Marsh until the Park Service can reliably conclude that restoration of Olema Marsh would have no more than a minor adverse potential for affecting municipal water supply operations. The dramatic change in effect between Alternatives C and D and other alternatives on salinity or chloride concentrations in upstream reaches of Lagunitas Creek appears to result from inclusion of Olema Marsh in the restoration project. While the Olema Marsh only increases the tidal prism -- one of the major factors driving the volume of saltwater in upstream reaches -- by 8 percent, the proximity of the Bear Valley Creek outlet and Olema Marsh to the Coast Guard well site (~1 mile) likely magnifies its effect on salinity structure on upstream reaches. Most of the tidal exchange between Lagunitas Creek/Tomales Bay and the Giacomini Ranch would continue to occur within the northern portions of the ranch, almost 2- 2.75 miles downstream of the Coast Guard wells.

To mitigate the potential impacts to NMWD operations and the quality of the groundwater supply from restoration of Olema Marsh, major adaptive restoration elements in Olema Marsh would not be implemented unless: 1) monitoring and further investigation of the relationship between Lagunitas Creek and the alluvial aquifer suggest that increased surface water salinities would not pose a threat to the quality of the municipal water supply; 2) there is new information suggesting that restoration of Olema Marsh would not increase salinities or otherwise pose a threat to the quality of the municipal water supply; or 3) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. These major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements such that they would only be

implemented if initial stage restoration elements did not achieve the desired degree of hydraulic connectivity between Olema Marsh and Lagunitas Creek.

Through iterative hydrodynamic modeling runs, the Park Service, ACR, and CSLC would work with its hydrologic consultants to identify limited restoration actions that could be implemented without causing major or substantial impacts to upstream Lagunitas Creek salinities. This limited restoration actions could include excavation of a "notch" in the berm or removal of the berm without shallow excavation of a flow path or vice versa. The Park Service will continue to work cooperatively with NMWD to ensure that there are more than minor adverse impacts to municipal water supply operations from implementation of the proposed project and to support NMWD in its efforts to develop increased water supply reliability through development of the Gallagher well. Should at some point in the future replacement of the Levee Road becomes feasible, construction would likely require temporary disconnection, establishment of a bypass, and later reconnection, which could result in a temporarily cut off of service to NMWD customers in Inverness Park, Silver Hills, and Bear Valley Road areas. This construction-related distribution issues would represent a minor adverse effect on municipal water supply and distribution to the local community.

Public Services – Wastewater Treatment and Disposal

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

The State of California regulates on-site disposal systems through the State Water Resources Control Board (SWRCB) and its districts, such as the San Francisco Regional Water Quality Control Board (RWQCB). California Water Code §13291(b) establishes minimum requirements for the permitting, monitoring, and operation of on-site disposal systems for preventing conditions of pollution and nuisance, although Regional Water Boards and local agencies implementing regulations retain the option of establishing requirements for on-site disposal systems that are more protective of water quality than the requirements contained in the code. These regulations apply to all new and existing on-site disposal systems, although they are addressed differently.

In Marin County, the RWQCB has ceded its authority over regulation of on-site treatment systems to the County. In 1971, the County of Marin enacted legislation (amended in 1978, 1984, and1987) that requires that construction of individual wastewater treatment systems be permitted by the County of Marin Environmental Health Services. It also directs the Public Health Officer to inspect all individual septic systems every two years and to approve their continued use (County Code 18.06; Individual Sewage Disposal Systems). In addition, when one or more bedrooms are added to a residential property, the Marin County Code requires an inspection of the septic system and, when necessary, requires that the septic system be upgraded. The Code prohibits construction, use, or maintenance of any component of an individual wastewater treatment system that is injurious to the public health and welfare or that is operated "in such a manner as to overflow onto public or private land or affect any river, stream, creek, spring, lake, pond, reservoir, swamp, ocean, bay, water supply, or water system."

Significance criteria developed by the state and county under CEQA are targeted generally more towards regions with centralized wastewater treatment systems: 1) exceedances of the wastewater treatment requirements of the applicable RWQCB; 2) construction of new wastewater treatment facilities or expansion of existing facilities that could cause significant environmental effects; 3) potential for the project to exceed capacity of existing treatment systems; and 4) the capacity of soils to adequately support the use of septic tanks or other wastewater treatment systems where sewers are not available. Other local projects have developed more regionally applicable criteria that focus more on whether the proposed project would 1) create a condition that would be "injurious to the public health and welfare" and 2) violate the County of Marin Environmental Health Services Division standards regarding impacts to private or public lands or aquatic resources.

General Assumptions and Methodologies

- The proposed project has the potential to have both beneficial and adverse impacts on-site wastewater disposal systems by changing both tidal and surface water hydrologic processes and dynamics within the West Pasture of the Giacomini Ranch. There are at least four (4) properties that directly adjoin the West Pasture that have on-site wastewater disposal systems.

- The proposed project is unlikely to affect on-site wastewater disposal systems adjoining the East Pasture, because these parcels are approximately 30- to 50- feet above the surrounding grade of the East Pasture.
- Many of the on-site wastewater treatment systems within the Tomales Bay watershed are operating under marginal conditions due to poor soil conditions, the proximity of these systems to existing surface water and groundwater discharges, or location within an active flood zone. DHS found that, of approximately 1,600 parcels in the Tomales Bay region assumed to have on-site disposal systems, all have poor soils for septic absorption fields as determined by USDA (DHS 2001 *in* RWQCB 2005). In addition, the majority of the parcels lack sufficient available land to install an on-site disposal system that meets the required sanitary setbacks and construction standards (DHS 2001 *in* RWQCB 2005).
- All of the parcels are situated on alluvial fans or deposition of sediments conveyed downstream and deposited on the perimeter of the West Pasture by the numerous drainages that flow off of the Inverness Ridge. Two (2) of the four (4) properties adjoining the West Pasture with on-site wastewater disposal systems are located within 100 feet of a stream, and a third is located within 100- to 500 feet of a stream. These parcels are subject to regular flooding by these creeks under even small- to medium stormflow events and also fall within the 100-year floodplain for Lagunitas Creek.
- These surface water flows are supplemented by copious amounts of groundwater that emerge from the base of the Inverness Ridge along many portions of the Project Area and either sheetflow across the pasture or travel sub-surface in a shallow water table (KHE 2006a). Based on monitoring of water tables conducted as part of the proposed project, it would appear that the groundwater table falls approximately 3 – to 9 feet below the ground surface adjacent to homes during most of the season, although, depending on the parcel, leach fields may be subject during rainfall events to regular surface flooding from Inverness Ridge creeks and an increase in emergent surface and sub-surface groundwater flow into the West Pasture.
- Impact thresholds for on-site wastewater treatment systems are based on the potential are based on the potential for the proposed project to change tidal and surface water hydrologic processes and conditions in such a way that it could substantially decrease efficacy of these systems relative to existing conditions and/or on the potential for increasing risks to public health and welfare, overflow onto public or private lands, or impacts to aquatic resources relative to existing conditions (Table 85).

TABLE 85. PUBLIC SERVICES – WASTEWATER TREATMENT AND DISPOSAL

Source: Marin County Code 18.06, California Water Code §13291(b) **Nature**: Adverse, Beneficial **Context**: Local Community, Regional **Duration**: Short-Term/Long-Term	
No Impact	There would be no potential for impact to on-site wastewater treatment disposal systems in the local community associated with the proposed project.
Negligible	There would be no more than a negligible or barely detectable effect on the efficacy of on-site wastewater treatment systems or the potential for overflow onto private or public lands or impacts to aquatic resources relative to existing conditions due to changes in tidal and surface water hydrologic processes and conditions associated with the proposed project. There would be no effect on public health or welfare.
Minor	There would be a measurable effect on on-site wastewater treatment systems, but it would only have a negligible or barely detectable effect on their efficacy or on public health or welfare. There would be a measurable effect on the potential for overflow onto private or public lands or impacts to aquatic resources relative to existing conditions due to changes in tidal and surface water hydrologic processes and conditions associated with the proposed project. If adverse, effects would not lead to a violation of County code ordinances.
Moderate	There would be an appreciable effect on on-site wastewater treatment systems and their efficacy, but these effects would not have more than a measurable effect on public health and welfare or on the potential for overflow onto private or public lands or impacts to aquatic resources relative to existing conditions. If adverse, effects would not lead to a violation of County code ordinances.
Major or Substantial	There would be a major or substantial effect on on-site wastewater treatment systems that would have an appreciable effect on public health and welfare or on the potential for overflow onto private or public lands or impacts to aquatic resources relative to existing conditions. If adverse, effects would lead to a violation of County code ordinances.

Impact Analysis

TABLE 86. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR WASTEWATER TREATMENT AND DISPOSAL
All impacts would be considered Local Community and are separately analyzed for Short-Term and Long-Term. Hyphenated entries refer to a range of potential effect.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Short-Term	No Impact	No Impact	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible
Long-Term	Adverse – Negligible/ Minor	Adverse-Negligible/ Minor	Adverse-Negligible/ Minor	Adverse-Negligible/ Minor	Adverse-Negligible/ Minor

No Action Alternative

Analysis: The No Action Alternative would generally have no effect over the short-term and in the immediate long-term on on-site wastewater disposal treatment systems adjacent to the West Pasture of the Giacomini Ranch, but it could have negligible to minor adverse effects relative to existing conditions over the long-term should levees along the West Pasture degrade (Table 86).

Under the No Action Alternative, levees in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. (The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch.) The remainder of the levee, including the levee on the West Pasture, would remain, although there would be no levee maintenance. The tidegate on Fish Hatchery Creek would be retained. As with all alternatives, certain creeks in the West Pasture would continue to be dredged to eliminate flood risks to adjacent private residences. Because of the limited scale of restoration, there would be only a negligible change within the Project Area and the West Pasture in surface tidal hydrologic processes or areas exposed to daily tidal action, surface freshwater hydrologic processes and conditions, flood dynamics, and sediment deposition on floodplains relative to baseline or existing conditions. These changes would be expected to have no effect on on-site wastewater treatment systems over the short-term and into the immediate long-term future.

Without maintenance, however, levees would be expected to degrade over time, thereby increasing the potential for greater change in hydrologic processes and functions. The rate of degradation is difficult to predict and location of breaching and flooding would be clustered around large scale storm events. An increase in tidal exchange with Lagunitas Creek with levee degradation would not be expected to affect these systems, because tides would not reach the elevations of the homes and septic systems (Mean Higher High Water or higher high tide event in West Pasture = 5.78 feet NAVD88; KHE 2006a). The on-site disposal wastewater treatment systems for properties adjacent to the West Pasture are most likely located between 8- to 14 feet NAVD88. Extreme tide events are not predicted to exceed 7.14 feet NAVD88 (KHE 2006a), and many of these events occur in conjunction with freshwater flooding such that the Project Area is likely to be inundated anyways. The rise and fall of tides could cause variation in the shallow groundwater table within the West Pasture through an increase in hydraulic pressure, but based on information from other studies and on-site monitoring, this effect would be expected to be extremely localized and only extend within a few feet from the edge of creeks such as Fish Hatchery and Lagunitas Creeks (Greg Kamman, KHE, *pers. comm*.). Long-term trends in sea level rise could eventually increase the upper elevation limits of areas inundated by tides. Recently published studies suggest that sea level rise rates may be much greater than predicted, with water levels rising as much as 3 feet by 2100 (Overpeck et al. 2006). This sea level rise, when combined with levee degradation, could lead to intrusion of tidal influence into large portions of the Giacomini Ranch pastures, particularly areas below 4 ft NAVD88. Even under worst case sea level rise scenarios, it is unlikely that on-site treatment disposal systems would be exposed to more than an occasional high tide due to their elevations.

In terms of surface freshwater hydrologic processes, should portions or all of levees along Lagunitas Creek degrade, hydraulic modeling results suggest that vertical flood elevations could increase as much as 1.6 foot under the 50-year flood event (KHE 2006a). This increase would cause more flooding of lower, undeveloped

portions of properties, but it would not be expected to affect homes or the areas where on-site wastewater treatment systems are located. During these events, homes and on-site wastewater treatment disposal locations are more likely to receive surface flooding by surface flows from adjacent Inverness Ridge drainages such as Fish Hatchery Creek and the 1906 Drainage, as well as higher groundwater discharge emerging from the base of the Inverness Ridge. While flood peaks in the West Pasture would be expected to be higher under unleveed conditions, the duration of flooding would be expected to decrease considerably, because degradation of the levee would allow floodwaters to flow out of the pasture and into Lagunitas Creek more quickly. This could actually improve efficacy of these treatment systems and decrease the potential for -- or length of time during which -- these systems could pose risks to public health and welfare or to aquatic resources through discharge to surface waters entering Lagunitas Creek and eventually Tomales Bay. At the very most, changes in freshwater and tidal hydrologic processes would have no more than a negligible adverse impact on wastewater disposal systems over the immediate long-term, with impacts potentially increasing to minor under some of the highest anticipated rates of sea level rise.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: No cumulative impacts would be expected under this alternative.

Conclusions: The No Action Alternative would generally have no effect over the short-term and in the immediate long-term on on-site wastewater disposal treatment systems adjacent to the West Pasture of the Giacomini Ranch, but it could have negligible to minor adverse effects over the long-term should levees along the West Pasture degrade (Table 86). Because of the limited scale of restoration, there would be only a negligible change within the Project Area and the West Pasture in surface tidal and freshwater surface hydrologic processes or conditions, and these changes would be expected to have no effect on on-site wastewater treatment systems over the short-term and into the immediate long-term future.

Without maintenance, however, levees would be expected to degrade over time, thereby increasing the potential for greater change in hydrologic processes and functions. An increase in tidal exchange with Lagunitas Creek with levee degradation would not be expected to affect these systems, because tides (Mean Higher High Water or higher high tide event in West Pasture = 5.78 feet NAVD88; KHE 2006a) would not reach the elevations of the homes and septic systems (~8- to 14 feet NAVD88). Should portions or all of levees along Lagunitas Creek degrade, hydraulic modeling results suggest that vertical flood elevations could increase as much as 1.6 foot under the 50-year flood event (KHE 2006a). This increase would not affect homes or the areas where on-site wastewater treatment systems are located. During these events, homes and on-site wastewater treatment disposal locations are more likely to receive surface flooding by surface flows from adjacent Inverness Ridge drainages such as Fish Hatchery Creek and the 1906 Drainage, as well as higher groundwater discharge emerging from the base of the Inverness Ridge. While flood peaks in the West Pasture would increase, the duration of flooding would decrease, because degradation of the levee would allow floodwaters to flow out of the pasture and into Lagunitas Creek more quickly. This could actually improve efficacy of these treatment systems and decrease the potential for -- or length of time during which -- these systems could pose risks to public health and welfare or to aquatic resources through discharge to surface waters entering Lagunitas Creek and eventually Tomales Bay. At the very most, changes in freshwater and tidal hydrologic processes would have no more than a negligible adverse impact on wastewater disposal systems over the immediate long-term, with impacts potentially increasing to minor under some of the highest anticipated rates of sea level rise.

Alternative A

Analysis: Under Alternative A, only the East Pasture would be restored. Restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The West Pasture and Olema Marsh would not be restored, and there would be no levee maintenance in the West Pasture.

Because there would be no active restoration or levee maintenance of the West Pasture, Alternative A would have identical effects on on-site wastewater treatment disposal systems to the No Action Alternative, with no

effect expected over the short-term and immediate long-term future and negligible to minor adverse effects relative to existing conditions potentially occurring over the long-term should levees degrade (Table 86).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: No cumulative impacts would be expected under this alternative.

Conclusions: Because there would be no active restoration or levee maintenance of the West Pasture, Alternative A would have identical effects on on-site wastewater treatment disposal systems to the No Action Alternative, with no effect expected over the short-term and immediate long-term future and negligible to minor adverse effects relative to existing conditions potentially occurring over the long-term should levees degrade (Table 86).

Alternative B

Analysis: Because limited restoration would be conducted in the West Pasture under Alternative B, this alternative would have very similar effects over both the short- and long-term on on-site wastewater treatment disposal systems as the long-term effects described for the No Action Alternative and Alternative A (Table 86). The most notable change between long-term conditions described under the No Action Alternative and Alternative B would come from removal of the tidegate on Fish Hatchery Creek and improvement of drainage during normal flow, as well as stormflow, conditions from the West Pasture. By removing the West Pasture's north levee and the tidegate, water levels and residence time of Fish Hatchery Creek and the West Pasture Old Slough discharge would be expected to decrease considerably. Hydraulic modeling results indicate that, with removal of the tidegate, Mean Tide Level would drop from 3.9 feet NAVD88 to 3.52 NAVD88 (KHE 2006a), increasing discharge of flows from the West Pasture into outboard portions of Fish Hatchery Creek. The artificially elevated standing water levels in Fish Hatchery Creek and the West Pasture Old Slough probably contribute to the base level of the shallow groundwater table in the West Pasture such that a decrease would effectively lower local groundwater levels (G. Kamman, KHE, *pers. comm*.). Relative to potential long-term effects of the No Action Alternative and Alternative A, this alternative could improve the efficacy of treatment systems by increasing drainage potential during both post-storm and non-storm conditions. This would further decrease the potential for -- or length of time during which -- these systems could pose risks to public health and welfare or to aquatic resources through discharge to surface waters entering Lagunitas Creek and eventually Tomales Bay. At the very most, changes in freshwater and tidal hydrologic processes would have no more than a negligible adverse impact on wastewater disposal systems over the short-term and immediate long-term, with impacts potentially increasing to minor under some of the highest anticipated rates of sea level rise.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: No cumulative impacts would be expected under this alternative.

Conclusions: Because limited restoration would be conducted in the West Pasture under Alternative B, this alternative would have very similar effects over both the short- and long-term on on-site wastewater treatment disposal systems as the long-term effects described for the No Action Alternative and Alternative A (Table 86). Alternative B would be expected to have negligible adverse effects on on-site wastewater disposal systems under the short-term and immediate long-term, with these benefits possibly increasing to minor should sea-level rise increase mean tide levels. The most notable change between long-term conditions described under the No Action Alternative and Alternative B would come from removal of the tidegate on Fish Hatchery Creek and improvement of drainage during normal flow, as well as stormflow, conditions from the West Pasture. Improved drainage could effectively lower local groundwater levels (G. Kamman, KHE, *pers. comm*.). Relative to potential long-term effects of the No Action Alternative and Alternative A, this alternative could improve the efficacy of treatment systems during both post-storm and non-storm conditions and,

thereby, further decrease the potential for -- or length of time during which -- these systems could pose risks to public health and welfare or to aquatic resources through discharge to surface waters entering Lagunitas Creek and eventually Tomales Bay. At the very most, changes in freshwater and tidal hydrologic processes would have no more than a negligible adverse impact on wastewater disposal systems over the short-term and immediate long-term, with impacts potentially increasing to minor under some of the highest anticipated rates of sea level rise.

Alternative C

Analysis: Alternative C would be expected to have identical effects on on-site wastewater disposal systems as Alternative B (Table 86). Hydraulic modeling results point to no difference in surface tidal elevations between Alternatives B-D, and maximum vertical flood elevations under Alternative C with its expanded amount of levee removal would be identical to those described under the No Action Alternative (+1.6 feet maximum during 50-year event), given complete or almost complete degradation of levees.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: No cumulative impacts would be expected under this alternative.

Conclusions: Alternative C would be expected to have identical effects on on-site wastewater disposal systems as Alternative B (Table 86). Hydraulic modeling results point to no difference in surface tidal elevations between Alternatives B-D, and maximum vertical flood elevations under Alternative C with its expanded amount of levee removal would be identical to those described under the No Action Alternative (+1.6 feet maximum during 50-year event), given complete or almost complete degradation of levees.

Alternative D

Analysis: Alternative D would be expected to have identical effects on on-site wastewater disposal systems as Alternative B (Table 86). There is no additional restoration of the West Pasture under Alternative D.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: No cumulative impacts would be expected under this alternative.

Conclusions: Alternative D would be expected to have identical effects on on-site wastewater disposal systems as Alternative B. There is no additional restoration of the West Pasture under Alternative D (Table 86).

Public Services - Traffic and Transportation

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

The Marin County Congestion Management Agency (CMA) creates, updates, and administers a Congestion Management Plan (CMP) for the county. The purpose is to establish Levels of Service (LOS) for designated freeways, state highways, and local arterials and to maintain those standards by increasing capacity or managing travel demand on those roads. The CMA annually monitors service levels on freeways, state highways, and routes of regional significance as part of the annual update. State Route 1 from Sir Francis Drake Boulevard to Point Reyes Station is part of the designated roadway network. Under CEQA, the County also evaluates changes in traffic conditions, with projects creating changes dropping the Level of Service (see description below) below Level D considered a substantial or "significant" impact.

Within the Coastal Zone, which incorporates the Project Area, the Local Coastal Program (LCP; Marin County Comprehensive Planning Department 1981) specifically identifies Sir Francis Drake Boulevard as providing a scenic driving experience for coastal visitors and an important access road for local residents. The LCP (Marin County Comprehensive Planning Department 1981) notes that, "in order to protect its scenic rural character, the road shall be maintained as a two-lane roadway." The LCP (Marin County Comprehensive Planning Department 1981) concluded that "Sir Francis Drake has adequate capacity to handle increased recreational and local traffic, although traffic patterns do occasionally create hazardous conditions for pedestrians and bicyclists in the areas of Inverness and Inverness Park."

The Point Reyes Station Community Plan (Marin County Community Development Agency 2001) focused on the lack of off-street parking as a concern, given the steady increase in numbers of visitors and area residents. All new structures and uses are required to provide off-street parking scaled to the level of use (Marin County Community Development Agency 2001). The Community Plan (2000) also supports efforts to reduce congestion through alternative transportation, including efforts to identify appropriate locations for paths that could be used for both bicycle commuting and recreation, including investigations into the feasibility of using the abandoned railroad right-of-way.

Significance criteria developed by the state and county under CEQA address: 1) substantial increases in vehicle trips or traffic congestion such that existing levels of service (LOS) on affected roadways would deteriorate below acceptable county standards (below Level D); 2) result in inadequate parking capacity; 3) have adequate parking and internal circulation so that off-site areas are not adversely affected; and 4) conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

General Assumptions and Methodologies

- The proposed project has the potential to impact traffic and transportation through changes in vehicular and truck traffic patterns associated with construction of the proposed project, as well as through changes in traffic volume and parking demand in local communities associated with potential increases in vehicles and visitors who might come to view the restored wetland or use the public access facilities.
- Existing and projected future transportation issues are defined for roads and intersections, using Level of Service (LOS) criteria. Separate criteria are established for roads, signalized intersections, and stop sign-controlled intersections. LOS for roadways uses a Volume-to-Capacity ratio based on conditions of free flow and the amount of restriction on maintaining speed limits or safe speeds for roadway conditions within designated areas. LOS for intersections is typically based on the amount of delay measured in seconds between when a vehicle reaches an intersection, including a queue or the amount of waiting in a line of traffic, and when it passes through the intersection.
- The County has established a minimum LOS for urban and suburban arterials, including highways that serve as arterials such as State Route 1, as LOS D or better and LOS E or better for Highway 101, Highway 580, State Route 37, and rural expressways. Although standards for rural roads or portions of roads are not clearly specified, for the purposes of this evaluation, Sir Francis Drake Boulevard (including Levee Road), Bear Valley Road, and Pierce Point Road would be interpreted as needing to meet LOS standards of D or better.
- BRW and Lee Engineering (1998) analyzed trends in the San Francisco Bay region population growth and trends in visitation and concluded that visitation and traffic would increase 1 percent annually from 1998-2010. Based on projections of 1 percent annual growth rate in visitation and traffic through 2010, LOS was not predicted to change for State Route 1, Sir Francis Drake Boulevard (Olema – Pierce Point Road), or Bear Valley Road between 1998 and 2010 (BRW and Lee Engineering 1998). However, Point Reyes-Petaluma Road was projected to decrease from LOS C in the afternoon to LOS D starting in 2005 (BRW and Lee Engineering 1998).
- Since 1998, park visitation has not increased 1 percent annually. Visitation reached a peak of 2,579,949 in 1992, but by 2004, visitation actually had decreased to 1,960,055, a drop of 21 percent (NPS, unpub. data). Visitation rose slightly in 2005 to 1,988,585 (NPS, unpub. data). However, BRW and Lee Engineering had projected that visitation would total 2,750,000 in 2005 based on a 1 percent annual increase, a difference of 28 percent or 761,415 more annual visitors than actual numbers of visitors in 2005.
- Based on the fact that visitation rates have not kept pace with projected visitation trends through 2005, the proposed project may be able to serve as many as 2,504 additional daily visitors through 2010 without causing any change in LOS for state and regional roadways and/or causing a drop in LOS below LOS D. Depending on the number of people per vehicle, an increase in visitation of 2,504 people would

generate approximately 656 (4 people per car) additional daily vehicle trips. For public reporting purposes, the Seashore uses a multiplier of 4 persons per vehicle for traffic counts on Sir Francis Drake Boulevard and Pierce Point Road.
- BRW and Lee Engineering (1998) did not analyze parking capacity in the Project Area and immediate vicinity. However, parking capacity was qualitatively assessed for existing and future parking needs by rating parking capacity as ranging from very high (occupancy does not exceed 90 percent of capacity during weekdays and weekends regardless of season) to very low (occupancy exceeds 90 percent of capacity during most weekdays and weekends regardless of season).
- Pedestrian and bicycle transportation will be addressed under Visitor and Resident Experience.

Described below are methodologies for impact indicators related to traffic and transportation, including specific assumptions or details on methodologies.

Traffic and Transportation – Construction-Related: Impact thresholds for construction-related traffic are based on analyses by BRW and Lee Engineering of increases in traffic related to park visitation and effects on LOS in the Point Reyes area and effects. The number of vehicles expected at Project Area during construction was based on daily round trips generated by construction personnel and the total number of round trips for dump trucks hauling excavated sediment and other materials. For the purposes of this analysis, it was assumed that approximately 30 percent of the construction personnel would car-pool or ride with at least one other employee, resulting in a multiplier of 1.3 times total number of employees expected at any one point in the construction period to derive average daily vehicle trips. Sediment excavated from the Project Area would largely be disposed of within quarries in the Seashore, most of which are located on the northern portion of the Point Reyes Peninsula off Pierce Point Road (Figure 7). Most non-soil materials would be disposed of at a municipal or commercial landfill such as the Redwood Landfill in Petaluma, which is approximately 20-25 miles away.

Impact thresholds for project-related traffic associated with implementation of the proposed project are based on analyses by BRW and Lee Engineering of the effects of increases in park visitation on LOS of specific roadway segments in the Point Reyes area. The effects of the proposed project on traffic and LOS are evaluated using a rough estimation of the potential number of vehicle and truck trips and the duration and intensity of hauling under the various alternatives. Potential increases in traffic from construction-related vehicle and truck trips are assessed using projected traffic volume and LOS of key roadway segments generated by BRW and Lee Engineering (1998) and adjusting these projections based on current trends in visitation. As directed by Park Service NEPA guidelines, impact thresholds incorporate a broad range of potential increases in construction-related traffic under the various alternatives (Table 87). In addition, construction analyses also factor in the potential for temporary road closures that could affect transportation patterns (i.e., rerouting of traffic) and access by emergency personnel and services. The effects of temporary road closures are differentiated between sole access arterial roadways or roadways that have no alternate routes or detour capabilities and alternate access roadways or roadways that have alternate routes or detour capabilities. Construction activities on weekends would be restricted, so construction-related closures would be unlikely to affect heavier weekend traffic patterns.

TABLE 87. PUBLIC SERVICES – TRAFFIC AND TRANSPORTATION – CONSTRUCTION-RELATED IMPACTS

Source: Marin CWP, Point Reyes Station Community Plan, LCP Zone II **Nature**: Adverse **Context**: Local Community, Regional **Duration**: Construction	
No Impact	There would be no potential for impact to traffic or transportation in the local community associated with construction of the proposed project.
Negligible	There would be a negligible or barely detectable increase (≤ 5 percent) in traffic in the local community associated with construction of the proposed project that would not cause LOS to drop below current levels nor below Level D. Construction would not be anticipated to result in any temporary road closures on sole access or other types of arterial roadways during the construction period that would last longer than 5 minutes for each closure. No rerouting of traffic would be necessary.
Minor	There would be a minor or measurable increase (> 5 percent and ≤ 15 percent) in traffic in the local community associated with construction of the proposed project. LOS may drop one LOS level below existing LOS, but it would not drop below Level D. Construction would not be anticipated to result in any temporary road closures on sole access arterial roadways during the construction period that would last longer than 15 minutes for each closure. For roadways with alternate routes or detour potential, temporary road closures would not exceed 10 hours. On these roads, traffic, including emergency services, would be temporarily rerouted to alternative roads,

TABLE 87. PUBLIC SERVICES – TRAFFIC AND TRANSPORTATION – CONSTRUCTION-RELATED IMPACTS

	when necessary.
Moderate	There would be a moderate or appreciable increase (> 15 percent and ≤ 30 percent) in traffic in the local community associated with construction of the proposed project. LOS would drop below current LOS levels, but it would not drop below Level D. Construction would not be anticipated to result in any temporary road closures on sole access arterial roadways during the construction period that would last longer than 30 minutes for each closure. For roadways with alternate routes or detour potential, temporary road closures would not exceed 20 hours. On these roads, traffic, including emergency services, would be temporarily rerouted to alternative roads, when necessary.
Major or Substantial	There would be a major or substantial increase (> 30 percent) in traffic in the local community associated with construction of the proposed project that might cause LOS to drop below Level D. Construction would be anticipated to result in any temporary road closures on sole access arterial roadways during the construction period that would last longer than 30 minutes for each closure. For roadways with alternate routes or detour potential, temporary road closures would exceed 20 hours. On these roads, traffic, including emergency services, would be temporarily rerouted to alternative roads.

Traffic and Transportation – Project-Related: Impacts to traffic and transportation from implementation or operation of the proposed project would result primarily from the potential increase in the number of visitors, residents, and vehicles coming to view the restored wetland or use public access facilities. Impact thresholds for project-related traffic associated with implementation of the proposed project are based on analyses by BRW and Lee Engineering of the effects of increases in park visitation on traffic volume and LOS of specific roadway segments in the Point Reyes area. Potential increases in traffic related to visitation are assessed using projected traffic volume and LOS of key roadway segments generated by BRW and Lee Engineering (1998) and adjusting these projections based on current trends in visitation. The potential effects of the proposed project on visitation are analyzed using information on the number of public access-related structures, facilities and attractions/uses provided under each of the various alternatives. The number of potential users of public access-related facilities at each major destination point within the Project Area (i.e., southern perimeter trail, eastern perimeter trail, etc.) is then projected as low, medium, or high based on the number of public access-related structures, facilities, and attractions/uses that would be available for use, as well as the current number of users of existing facilities in the Project Area. For comparison purposes, projections took into account the recorded number of users of other structures, facilities, and attractions/uses within the Seashore at major destination points. To ensure that the analysis was conservative or cautious such it errs on the side of overestimating impacts, peak visitation for each major destination point within the Project Area was assumed to occur simultaneously. These peak visitation numbers were then converted to vehicle numbers based on the assumption that approximately 70 percent of the visitors would be driving alone, while 30 percent would be paired in vehicles. As directed by Park Service NEPA guidelines, impact thresholds incorporate a broad range of potential increases in project-related traffic under the various alternatives (Table 88).

TABLE 88. PUBLIC SERVICES – TRAFFIC AND TRANSPORTATION – PROJECT-RELATED EFFECTS

Source: Marin CWP, Point Reyes Station Community Plan, LCP Zone II **Nature**: Adverse **Context**: Local Community **Duration**: Long-Term	
No Impact	There would be no potential for impact to traffic or transportation in the Point Reyes area associated with implementation of the proposed project.
Negligible	There would be a negligible or barely detectable change (≤ 5 percent) in traffic associated with implementation of the proposed project that would cause no change in the LOS or cause LOS to drop below Level D.
Minor	There would be a minor or measurable change (> 5 percent and ≤ 15 percent) in traffic associated with implementation of the proposed project that would cause no change in the LOS or cause LOS to drop below Level D.
Moderate	There would be a moderate or appreciable change (> 15 percent and ≤ 30 percent) in traffic associated with implementation of the proposed project that might cause a change in the LOS, but would not cause LOS to drop below Level D.
Major or Substantial	There would be a major or substantial change (> 30 percent) in traffic associated with implementation of the proposed project or an increase in traffic of any magnitude that would cause LOS to drop below Level D.

Parking – Project-Related Effects: Impacts to parking from implementation or operation of the proposed project would result primarily from the potential increase in the potential number of visitors and residents that

would be driving to the Project Area to use public access facilities and therefore require parking. Impact thresholds for project-related parking associated with implementation of the proposed project are based on analyses of increases in project-related vehicular trips and the presence or absence of parking for key destination areas or points for public access proposed under the various alternatives. To assess effects on parking, the number of spaces within each formal and informal parking lot was taken into consideration, along with estimated capacity or qualitative assessments of how heavily particular lots are currently used (e.g., low, medium, and high), with high characterized as those lots with occupancy of 90 percent of capacity or higher during weekdays or weekends (BRW and Lee Engineering 1998). Because there are no formal visitor parking lots in Point Reyes Station, parking was assumed to be at capacity on weekends and possibly some weekdays most of the year based on concerns regarding the lack of parking expressed in the Community Plan (Marin County Community Development Agency 2001) and by local residents during scoping. Using the projected increase in vehicles and qualitative assessment of parking availability and demand, impact thresholds focus qualitatively on the potential for increases in visitation associated with the proposed project to cause exceedance of the capacity of both formal and informal parking lots and areas during weekday and weekend periods and to adversely effect already congested parking conditions in Point Reyes Station (Table 89).

TABLE 89. PUBLIC SERVICES – PARKING – PROJECT-RELATED EFFECTS

Source: Marin CWP, Point Reyes Station Community Plan **Nature**: Adverse **Context**: Local Community **Duration**: Long-Term	
No Impact	There would be no potential for impact to parking in the Point Reyes area associated with implementation of the proposed project.
Negligible	There would be only a barely detectable change in parking demand relative to baseline conditions such that capacity of formal and informal parking lots. If parking demand increases, areas within the vicinity of the Project Area would generally be sufficient to handle parking demand even on busy weekends. There might be a negligible or barely detectable change (average daily ≤ 5 cars) relative to baseline conditions in parking demands in Point Reyes Station associated with implementation of the proposed project.
Minor	There would be a minor change in parking demand relative to baseline conditions. If parking demand increases, capacity of formal and informal parking lots within the vicinity of the Project Area would be generally sufficient to handle parking demand during the weekdays and most weekends, although parking lots would be at or near capacity on some of the very busiest weekends in the highest visitation months (President's Day weekend and weekends in May and August, BRW and Lee Engineering 1998). There might be a minor, but measurable change (average daily ≤ 10 cars) relative to baseline conditions in parking demands in Point Reyes Station associated with implementation of the proposed project.
Moderate	There would be a moderate change in parking demand relative to baseline conditions. If parking demand increases, capacity of formal and informal parking lots within the vicinity of the Project Area would be generally sufficient to handle parking demand during the weekdays and off-peak season (November through February) weekends, although parking lots would be at or near capacity on weekends during the peak visitation season (May – August). There might be a moderate and appreciable change (average daily ≤ 20 cars) relative to baseline conditions in parking demands in Point Reyes Station associated with implementation of the proposed project.
Major or Substantial	There would be a major or substantial change in parking demand relative to baseline conditions. If parking demand increases, capacity of formal and informal parking lots within the vicinity of the Project Area would only be sufficient to handle parking demand during the weekdays. Parking lots would be at or near capacity on almost all weekends. There would be a major and substantial change (average daily > 20 cars) relative to baseline conditions in parking demands in Point Reyes Station associated with implementation of the proposed project.

Alternative Transportation (Pedestrian and Bicycle Circulation) – Project-Related Effects: Impact thresholds focus on changes in alternative transportation routes or segments of routes resulting from implementation of the proposed project (Table 90). For the purposes of this analysis, alternative transportation is considered as alternative transportation routes or segments of routes that provide connectivity between communities and/or community business and residential areas and that would allow residents and visitors to walk or bicycle rather than use cars. Alternative transportation routes or segments of routes are differentiated from trails on the basis that trails do not necessarily provide connection between communities, but rather are intended to provide visitors and residents opportunities to enjoy natural resources of the region through passive and active activities (e.g., hiking, birdwatching, swimming, wildflower areas, etc.). Public access components that meet these criteria are assessed separately under Visitor and Resident Experience, although there may be overlap with facilities that serve both trail and alternative transportation needs. For this analysis, the number

of alternative transportation routes and route segments under the various alternatives is totaled and compared with the existing number of routes and route segments to evaluate potential changes to alternative transportation resources. Improvements to existing alternative transportation routes or segments of routes that increase accessibility through increasing bicycle and pedestrian safety or the quality of the access -- e.g., adding guardrails, moving path away from edge of road, leveling or paving path, etc. – are incorporated, as well, although weighted lower in analysis than new routes and route segments.

TABLE 90. PUBLIC SERVICES – ALTERNATIVE TRANSPORTATION (PEDESTRIAN AND BICYCLE CIRCULATION)

Source: Park Service Management Policies, Marin CWP, Point Reyes Station Community Plan, LCP Zone II **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Long-Term (Construction Effects addressed under Visitor and Resident Experience)	
No Impact	There would be no potential for impact to alternative transportation resources in the local community associated with implementation of the proposed project.
Negligible	The proposed project would result in an undetectable or barely detectable change in the number or accessibility/quality of alternative transportation routes and route segments in the local community.
Minor	The proposed project would result in a measurable change in the number or accessibility/quality of alternative transportation routes and route segments in the local community.
Moderate	The proposed project would result in an appreciable change in the number or accessibility/quality of alternative transportation routes and route segments in the local community.
Major or Substantial	The proposed project would result in a major or substantial change in the number or accessibility/quality of alternative transportation routes and route segments in the local community.

Impact Analysis

TABLE 91. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR TRAFFIC AND TRANSPORTATION
All impacts would be considered Local Community and are separately analyzed for Construction and/or Short-Term/Long-Term. Hyphenated entries refer to the range of impact intensity estimated for individual pollutants.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Construction-Related Effects	Adverse-Negligible	Adverse-Negligible/ Minor	Adverse-Minor	Adverse-Minor/ Moderate	Adverse-Minor/ Moderate
Project-Related Effects	Adverse - Negligible	Adverse-Negligible/ Minor	Adverse-Negligible/ Minor	Adverse-Negligible/ Minor	Adverse-Negligible
Parking	Adverse-Negligible	Adverse-Minor/ Moderate	Adverse-Minor/ Moderate	Adverse-Minor	Adverse-Minor
Alternative Transportation	No Impact	Beneficial-Moderate	Beneficial - Moderate	Beneficial - Minor	Beneficial - Negligible

No Action Alternative

Analysis: The No Action Alternative would generally have no impact to minor adverse effects on traffic and transportation in the local community during construction and after implementation (Table 91). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities.

Negligible adverse effects on traffic in the local community would potentially occur during construction of the small wetland restoration/mitigation component in the East Pasture. Construction of this component would occur approximately over a two- to three-month period in the late summer-early fall during one construction

year. Most of the impacts to transportation on state and local roadways in or near Point Reyes Station such as State Route 1 and Mesa Road during the construction period would result from increases associated with commuting of construction personnel to the Project Area, trailering of construction equipment, and hauling of excavated sediments from the Project Area to local quarries on the Point Reyes Peninsula. A much smaller volume of non-soil material would be generated. This non-soil material would need to be hauled to a municipal landfill such as the Redwood Landfill in Petaluma, approximately 20-25 miles away, using other local roadways such as Point Reyes- Petaluma Road and Novato Boulevard: the number of truck trips would keep effects of regional hauling on traffic negligible. No construction-related temporary road closures would be anticipated. Hauling of excavated sediments would be expected to generate only approximately 44 total truck trips under the No Action Alternative. For the purposes of this analysis, the potential number of truck roundtrips per day was assumed to total up to 20 or 40 single truck trips. Hauling would, therefore, be expected to have only very temporary, negligible adverse impacts on local arterial roadways such as Mesa Road, State Route 1, Levee Road, and the eastern portions of Sir Francis Drake Boulevard. Hauling conducted under the No Action Alternative would not have more than a negligible adverse impact on the condition of local roads relative to existing conditions.

The duration of construction and particularly hauling is short enough to keep the overall impacts to the local community very negligible and to not change the LOS or decrease LOS below Level D, the county's minimum standard for arterial roadways. Based on the fact that visitation rates have not kept pace with projected visitation trends through 2005, the proposed project may be able to have as many as 656 additional daily vehicle trips without causing a change in the LOS estimated in 1998 (BRW and Lee Engineering 1998). In fact, because of decreases in park and regional visitation, most of these roads appear to be potentially operating at a LOS of B or C currently, an improvement since 1998 when several roads such as Bear Valley had high enough traffic levels to be rated as operating at a Level D LOS (BRW and Lee Engineering 1998).

The No Action Alternative would not generate more than a very negligible increase in project-related traffic. As part of the existing purchase agreement with the Giacomini Trust, the Giacomini family received a 7-year Reservation-of-Use agreement under which the Giacomini Ranch will continue to operate as a dairy until the lease expires in spring 2007. At that time, the dairy will be closed, and there would be no potential for future operation of a dairy, because the dairy facility would be split approximately in half in terms of ownership. However, in keeping with management directives in the Seashore's GMP (1980), the Giacomini Ranch could be leased for grazing of dairy heifers or beef cattle through a separate environmental review process. Should grazing be allowed, livestock trucks would be expected to infrequently access the East and/or West Pastures for drop-off and pick-up of animals. Park Service staff would also occasionally access the Project Area for flood control maintenance, existing trail repair, and other management-related purposes. Assumption of full management of the Giacomini Ranch by the Park Service may also encourage more visitors to use existing public access facilities, but any increase would be expected to be very negligible and to not change the LOS of any of the state and local roadways or cause LOS to drop below Level D.

Because of the negligible increase in visitation, the No Action Alternative would also be expected to have very negligible effects on parking demand in the local community relative to baseline conditions. Two formal parking lots serve existing trails in the Project Area and vicinity. There is a Park Service-maintained parking lot at the trailhead for Tomales Bay Trail with approximately 14 parking spaces that generally have, based on the BRW and Lee Engineering criteria, very high parking capacity such that occupancy does not ever exceed 90 percent of capacity. Another parking lot at White House Pool County Park with approximately 43 parking spaces probably ranges in capacity from medium (occupancy does not exceed 90 percent of capacity except during weekdays and weekends in holiday and high season periods) to high (occupancy does not exceed 90 percent of capacity on weekdays and most weekends except some holiday and high season period weekends) capacity. Parking for the informal social path on the Giacomini Ranch north levee consists of one or more roadside pull-outs that can fit approximately 23 vehicles. During most of the year, parking capacity is very high, although parking often overflows onto the street during the winter high tide periods because of the high number of birdwatchers. There are no designated formal or informal parking areas for the Giacomini Ranch East Pasture and Green Bridge County Park trail network, with most people parking alongside homes on 3rd and C Street in Point Reyes Station or walking to the trail from other parts of town. Street parking is often at a premium on many, if not all, weekends in the town of Point Reyes Station, with people parking often some distance from the downtown district. Therefore, parking capacity for this trail is rated as low to possibly medium.

Alternative transportation in the form of pedestrian and bicycle routes and segments of routes in the Project Area and vicinity is restricted to limited pedestrian and bicycle use of Sir Francis Drake Boulevard near Inverness Park, with slightly higher numbers of pedestrians and bicyclists using White House Pool County Park

and Levee Road to move between Silver Hills and Inverness Park areas and Point Reyes Station. Use has been limited by the lack of dedicated formal bike and pedestrian paths along arterial roadways such as Sir Francis Drake Boulevard, Levee Road, State Route 1, and Bear Valley Road. As described in Chapter 3 under Public Services – Traffic and Transportation, several studies have been conducted over the past few decades that have identified the need for or evaluated the feasibility of constructing a bike path in the Point Reyes Station, Inverness Park, and Inverness portion of Tomales Bay, including the West Marin Pathways study (Brian Wittenkeller & Associates and Copple Foreaker & Associates 1988) and an alternative transportation study contracted by Marin County (Alta Transportation Consulting 2001). Many of these proposed bike path alignments have been incorporated as objectives in county, community, and LCP plans and planning documents. The LCP (Marin County Comprehensive Planning Department 1981), *Marin County Unincorporated Area Bicycle and Pedestrian Master Plan* (Alta Transportation Consulting 2001), and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) support exploration of the feasibility of creating an East/West Greenway along the railroad-right-of-way and the concept of bike and pedestrian trail network in the West Marin area. However, implementation has seemingly been stymied by lack of funding and technical challenges and constraints of construction within or along west Marin's narrow road corridors. Although changes to alternative transportation may occur under other alternatives, no changes to alternative transportation conditions would occur under this alternative.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There are three (3) currently proposed projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented. These would be the proposed land exchange between the Park Service and the Giacomini family, Sir Francis Drake Boulevard Repaving Project, and the Culvert Cleaning near Olema Marsh, all of which are proposed for implementation in fall 2007. As part of the proposed land exchange, buildings would be removed from the Dairy facility: these removal efforts would generate additional truck trips. It is likely that the proposed building removal would be conducted prior to implementation of restoration, however, in the event that removal efforts are delayed, traffic volume could be increased on State Route 1 in Point Reyes Station, because materials would be hauled to a municipal landfill likely via State Route 1 and Pt Reyes-Petaluma Road. The County has tentatively planned to schedule the road repaving project after hauling for the proposed project would be completed (Marl Madayag, County of Marin Department of Public Works, *pers. comm*.), so it is likely that construction schedules would be staggered to some degree and not directly overlap. The proposed project, in combination with the proposed repaving project, would not have an adverse impact relative to existing conditions, would not be expected to have a cumulative adverse impact on the repaved portions of Sir Francis Drake Boulevard, because most or all of the hauling would be completed before repaving begins. Should the culvert cleaning move forward in fall 2007, it is unlikely that the volume of truck trips would raise cumulative traffic volume above the negligible level for roads such as Levee Road, Bear Valley Road, and State Route 1.

Conclusions: The No Action alternative would result in generally either no or only very negligible impacts on traffic and transportation in the local community, with most of the impacts from construction-related effects associated with the 11-acre wetland restoration/mitigation component. The most noticeable effects on traffic during the relatively short two to three-month construction period would occur on less heavily used local roadways such as C Street, Mesa Road, and Pierce Point Road, which would be subject to very temporary adverse impacts from hauling of excavated sediments to local quarries and/or commuting of construction personnel to and from the Project Area. Project-related effects on traffic and parking demands would be very negligible relative to baseline conditions and limited to vehicles and trucks associated with visitors and residents using existing public access facilities, flood control-related maintenance, and livestock transport. No changes in alternative transportation conditions would occur within the local community.

Alternative A

Analysis: Alternative A would generally have negligible to moderate effects on traffic and transportation in the local community during construction and after implementation (Table 91). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh, except for the possible future extension of the southern perimeter trail to

Inverness Park. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

Most of the negligible to minor impacts to transportation on state and local roadways in or near Point Reyes Station during the construction period would result from increases associated with commuting of construction personnel to and from the Project Area, trailering of construction equipment, and hauling of excavated sediments from the Project Area to local quarries on the Point Reyes Peninsula. Over the life of the proposed project, hauling would generate approximately 2,600 truck trips compared to 44 truck trips under the No Action Alternative. (This number does not include hauling associated with extension of the southern perimeter trail to Inverness Park: this component would be subject to further environmental compliance through a separate review process.) The approach to disposal of excavated soils has not been defined yet, however, it would either involve stockpiling of excavated soils with hauling concentrated in a short time period, resulting in a high number of daily trips, or no stockpiling with fewer daily truck trips occurring over the entire construction period. For the purposes of this analysis, the potential number of daily truck roundtrips was assumed to be 32 or 64 single trips, based on use of three (3) to four (4) trucks per day for a period of approximately 2.5 months during one construction season. Hauling conducted under the No Action Alternative would not have more than a negligible adverse impact on the condition of local roads relative to existing conditions.

In general, the effects of construction on traffic would be highest on smaller and more local roadways such as C Street, Mesa Road, Levee Road, and Pierce Point Road. Because of decreases in park and regional visitation, most of these roads appear to be potentially operating at a LOS of B or C currently, an improvement since 1998 when several roads such as Bear Valley had high enough traffic levels to be rated as operating at a Level D LOS (BRW and Lee Engineering 1998). Hauling would be expected to have minor adverse impacts on local arterial roadways such as Levee Road and the eastern portion of Sir Francis Drake Boulevard during construction months, with temporary increases in traffic roughly estimated at around 8 ~~4~~ percent. During hauling periods, LOS on Levee Road would drop from its current estimated LOS of Level C to Level D, but would not drop below Level D. Impacts to traffic from repeated haul trips would be more apparent further north on Sir Francis Drake Boulevard and Pierce Point Road, which leads to several of the high priority quarries. Truck trips would potentially cause roughly an estimated a 13percent increase in traffic on Pierce Point Road, which would be characterized as a minor adverse effect. LOS would drop from a current estimated LOS of Level B to Level C during this period, but would not drop below Level D. A much smaller volume of non-soil material would be generated, and this material would need to be hauled to a municipal landfill such as the Redwood Landfill in Petaluma, approximately 20-25 miles away, using other local roadways such as Point Reyes- Petaluma Road and Novato Boulevard: the total number of truck trips (~32) would keep effects of regional hauling on traffic negligible.

Under this alternative, the only road closures that may be required would be for installation of the Lagunitas Creek pedestrian bridge. A one-day closure of Levee Road would be required to accommodate delivery of the 200-foot prefabricated bridge. Vehicle passage on Levee Road may also be reduced periodically to a single lane for a period of 1- to 3 days during construction of bridge abutments and completion of deck installation. Complete and partial road closure would be expected to have no more than a minor effect on traffic.

Alternative A would also have the potential for a negligible to minor adverse effect on traffic after construction is completed due to the potential increase in use of expanded and improved public access facilities by park visitors and residents. Visitor and resident use of the newly constructed or enhanced southern and eastern perimeter trails would be expected to have minor adverse effects on roadways directly adjacent to the trail such as Levee Road, C Street, and Mesa Road, as well as some of the roads used to access these areas such as Bear Valley Road. Under this alternative, an ADA-compliant trail would originate from 3rd and C Street and follow the perimeter of the Point Reyes Mesa northwards to a viewing area located at the western edge of the former dairy facility. This trail --and increased use of existing trails such as the Olema Marsh trail due to better connectivity with other trails -- would be expected to potentially increase traffic by as much as 4- to 10 percent in the immediate vicinity of the southern perimeter trail relative to baseline conditions. Expansion of public access facilities, including conversion of the Tomales Bay Trail to a through-trail on the eastern perimeter of the Giacomini Ranch, would have only negligible effects on larger access roads such as State Route 1 south and north of Point Reyes Station, with increases in traffic roughly estimated at less than 2 percent.

Given the negligible to minor increases expected in vehicular traffic, Alternative A would also be expected to have minor to perhaps moderate effects on parking demand in the local community relative to baseline conditions. Under this alternative, capacity of formal and informal parking lots within the vicinity of the Project Area would generally be sufficient to handle parking demand during the weekdays and most weekends, although parking lots would be at or near capacity on some of the very busiest weekends in the highest visitation months (President's Day weekend and weekends in May and August). Formal parking for the western end of the southern perimeter trail would be located at White House Pool County Parking lot, which has 43 designated spaces. However, this trail would serve a considerable number of local residents who would walk, bicycle, or ride horses to the trail, thereby resulting in only a minor increase in parking demand for this lot.

As the eastern trail entrance would continue to exist at the corner of 3rd and C Streets, residents and visitors would also continue to park along adjacent streets in western Point Reyes Station. Street parking is often at a premium on many, if not all, weekends in the town of Point Reyes Station, with people parking often some distance from the downtown district. A minor to perhaps moderate increase in parking demand in western Point Reyes Station would potentially result from enhancement and expansion of the existing Giacomini Ranch East Pasture levee trail, with parking demand expected to increase by as much as three (3) to 10 cars on an average daily basis depending on the season and time of week. Parking for the eastern perimeter trail would be available at a newly created parking area off Mesa Road (approximately 5 cars), as well as the Tomales Bay Trailhead (approximately 14 cars). As with the southern perimeter trail, this enhanced through-trail would be expected to attract many local residents who would walk or ride to the trailheads.

Alternative A would have a moderate beneficial effect on alternative transportation in the local community. The southern perimeter trail would increase connectivity between Inverness Park and Point Reyes Station through construction of a through-trail from White House Pool County Park to an improved trail that would replace the existing path on the Giacomini Ranch East Pasture levee via a new bridge over Lagunitas Creek. In addition, the Park Service and CSLC would explore collaborating with the County to extend the trail northward along Sir Francis Drake Boulevard into Inverness Park at some point in the future. This trail would serve pedestrians, bicyclists, and equestrians. The eastern perimeter trail would also provide some alternative transportation benefits to the Point Reyes Station community, although opportunities to connect communities or businesses and residential areas are comparatively more limited.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be generally the same as described under the No Action Alternative, except for potential cumulative impacts related to the Sir Francis Drake Boulevard Repaving Project. The County has tentatively planned to schedule the road repaving project in fall 2007 after hauling would be completed for the first phase of the proposed project (M. Madayag, County of Marin Department of Public Works, *pers. comm*.). However, hauling for the second phase of the proposed project would be more intense and could have an offsetting, negligible to minor adverse effect on conditions of the newly repaved portions of Sir Francis Drake Boulevard. The Park Service and CSLC would develop a monitoring program for 2008 to evaluate existing conditions of roads prior to start of hauling and would work with the County of Marin to ensure that truck loads remain within legal road limits.

Conclusions: Alternative A would generally have minor adverse effects on traffic, transportation, and road conditions in the local community. The most noticeable effects on traffic during the construction period would occur on lightly and moderately used local roadways such as C Street, Mesa Road, Levee Road, and Pierce Point Road, which would be subject to minor adverse impacts from hauling of excavated sediments to local quarries and/or commuting of construction personnel to and from the Project Area. During the four (4) months of hauling of excavated sediments, construction-related traffic could decrease LOS on Levee Road and Pierce Point Road below their current estimated LOS of Level C and Level B, respectively, but LOS would not drop below Level D, the County's minimum standard. Minor impacts may result from temporary traffic stops and road closure associated with the construction of the pedestrian bridge, with the bridge potentially requiring closure of Levee Road for one (1) day. Expansion and improvement of public access facilities would result in negligible to minor adverse effects on traffic from increased visitation, although a lack of formal parking lots in Point Reyes Station might result in impacts on parking demands being moderate rather than minor in this part of town. This alternative would have moderate beneficial effects on alternative

transportation by improving connectivity between Inverness Park and Point Reyes Station through construction of the southern perimeter through-trail, as well as, to a much lesser degree, by improving connecting connectivity between Point Reyes Station neighborhoods through construction of the eastern perimeter through-trail.

Alternative B

Analysis: Alternative B would have very similar negligible to moderate effects on traffic and transportation in the local community as Alternative A during construction and after implementation of the proposed project (Table 91). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. There would also still be the potential for extension of the southern perimeter trail to Inverness Park.

Construction-related traffic impacts on state and local roadways in or near Point Reyes Station would be very similar to Alternative A, with minor effects expected for most roadways. Some of the notable differences are that, under Alternative B, construction activities would expand into the Giacomini Ranch West Pasture, thereby increasing traffic volume associated with construction equipment and personnel along perimeter roads such as Levee Road and the southern portion of Sir Francis Drake Boulevard near Inverness Park. The number of truck trips required to haul excavated sediments off-site to the local quarries would climb from approximately 2,600 under Alternative A to approximately 3,600 trips under Alternative B. Analyses assume that hauling would involve continuous running of three (3) to four (4) trucks per day or 32 truck round trips per day (64 single truck trips) for approximately four (4) months spread over two construction seasons. A much smaller volume of non-soil material (41 truck trips) would need to be hauled to a municipal landfill such as the Redwood Landfill in Petaluma, approximately 20- 25 miles away, using other local roadways such as Point Reyes-Petaluma Road and Novato Boulevard.

The degree of traffic control and closure would increase under Alternative B, as well On Sir Francis Drake Boulevard, traffic may be stopped intermittently or narrowed down to one lane by flagmen on Sir Francis Drake Boulevard to allow movement of large or heavy equipment in and out of the West Pasture, although stops would be expected to be very short-lived (< 5- 10 minutes). During hauling on excavated sediments from the West Pasture, the flow of traffic may be interrupted by entrance of hauling trucks onto the road. Traffic control measures such as speed limit controls, caution signs, and, in some cases, flagging, would be provided at all exits to ensure vehicle safety.

The effects of the new and improved public access facilities on traffic and parking volume and patterns and alternative transportation would be very similar to those described under Alternative A. With elimination of the existing informal trail on the West Pasture north levee, peak traffic and parking conditions along Sir Francis Drake Boulevard would actually improve relative to baseline conditions, as heavy visitor use during the three to four periods of extreme high tides during the winter often cause traffic and parking problems along the Inverness Park portion of this road.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative A.

Conclusions: Alternative B would have very similar negligible to moderate impacts on traffic, transportation, and road conditions in the local community as Alternative A. The most noticeable effects on traffic during the construction period would occur on lightly and moderately used local roadways such as C Street, Mesa Road, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road, which would be subject to minor adverse impacts from hauling of excavated sediments to local quarries, trailering of construction equipment, and temporary traffic stops, road closures, and detours. During the four (4) months of hauling of excavated sediments, construction-related traffic could decrease LOS on Levee Road and Pierce Point Road below their current estimated levels of Level C and Level B, respectively, although LOS would not drop below Level D, the County's minimum standard. Additional minor traffic impacts may be incurred from West Pasture

construction and construction of the pedestrian bridge, with the latter potentially requiring closure of Levee Road for one (1) day. Construction and expansion of public access facilities would result in negligible to minor adverse effects on traffic and parking demands from increased visitation, although a lack of formal parking lots in Point Reyes Station might result in the proposed project having moderate rather than minor impacts on the already low-capacity parking situation in the western portion of town. This alternative would have identical moderate beneficial effects as Alternative A on alternative transportation by improving connectivity between Inverness Park and Point Reyes Station through construction of the southern perimeter through-trail, as well as, to a much lesser degree, by improving connectivity between neighborhoods through construction of eastern perimeter through-trail.

Alternative C

Analysis: Alternative C would have negligible to moderate effects on traffic and transportation in the local community during construction and after implementation (Table 91). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. There would also still be the potential for extension of the southern perimeter trail to Inverness Park. In Olema Marsh, an adaptive restoration approach would be undertaken through fill excavation and possible culvert replacement to improve hydraulic connectivity and improve drainage of currently impounded waters.

Alternative C would have very similar minor to moderate adverse effects on traffic in the local community during construction as described under Alternatives A and B. Relative to existing traffic conditions, construction would be expected to have minor to moderate adverse impacts on local arterial roadways such as Mesa Road, C Street, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road from hauling of excavated sediment, trailering of construction equipment, and commuting of construction personnel. Over the entire life of the proposed project, hauling would be expected to generate approximately 6,275 truck trips under Alternative C from 3,625 under Alternative B and 44 under the No Action Alternative. The approach to disposal of excavated soils has not been defined yet, but analyses assume a median number of 32 truck roundtrips per day (64 single haul trips), with running of three (3) to five (5) trucks per day during a total of approximately seven (7) to eight (8) months spread over two construction seasons. Temporary increases in traffic during those seven (7) to eight (8) months would range from 8 to 13 percent and cause LOS on Levee Road and Pierce Point Road to drop below their current estimated LOS of Level C and Level B, respectively, but LOS would not drop below Level D, the County's minimum standard. The increase in truck trips would increase the potential for hauling to have an adverse impact on road condition from negligible under Alternative B to minor under Alternative C.

In addition to the Sir Francis Drake Boulevard traffic stops and temporary road closures discussed under Alternative B, replacement of either or both the Levee Road culvert and the Bear Valley Road culvert as part of the Olema Marsh restoration component would likely require traffic stops, lane closures, and full closure of Levee Road and Bear Valley Road, respectively, over a period of three (3) days to 14 days depending upon the restoration approach (i.e., replace culvert or construct bridge). Both Bear Valley and Levee Roads serve as important links to Sir Francis Drake Boulevard, the only road connecting the "mainland" portion of Marin County to homes, businesses, ranches, and northern portions of the Seashore that occur on the Point Reyes Peninsula. Replacement of these culverts with either improved culverts or bridges would not be undertaken simultaneously, so traffic could be rerouted onto one or the other of these two key arterial roadways. Should Levee Road be fully closed on a temporary basis, a detour or alternate route to Sir Francis Drake Boulevard using State Route 1 and Bear Valley Road would add approximately 5 minutes to the commute time. These construction-related road closures would have minor to moderate effects on local traffic depending on the number of traffic stops, interruption of traffic flow through flagging and lane closure, duration of road closure, and length of detour.

Similar to Alternative B, Alternative C would have negligible to minor adverse effect on traffic following implementation due to the projected increase in use by park visitors and residents of expanded public access facilities. Scaling back of the eastern perimeter through-trail to two spur trails would reduce effects on traffic and parking in the northern portion of Point Reyes Station somewhat, although impacts on local roadways such as Mesa Road would still be characterized as minor. Under this alternative, the ADA-compliant trail would be switched to the Mesa Road spur trail that leads out to the proposed viewing area near the Giacomini Hunt Lodge. The trail entrance at C Street in Point Reyes Station would be eliminated, with all access to the southern perimeter trail occurring through an improved entrance to the Green Bridge County Park near the

Green Bridge or through White House Pool County Park. Elimination of the C Street trail entrance would reduce potential effects of the southern perimeter trail on parking demand near C Street to at least minor, if not negligible. With elimination of the existing informal trail on the West Pasture north levee, peak traffic and parking conditions along Sir Francis Drake Boulevard would actually improve relative to baseline conditions, as heavy visitor use during the three to four periods of extreme high tides during the winter often cause traffic and parking problems along the Inverness Park portion of this road.

Elimination of the C Street trail entrance for the southern perimeter trail, combined with conversion of the eastern perimeter through-trail to two spur trails, would reduce the benefits of Alternative C to alternative transportation and connectivity between communities and neighborhoods relative to the Alternatives A and B. The C Street trail entrance provides more direct access to the town of Point Reyes Station, but also has more potential for disturbance of adjacent landowners through noise, trash, and increase in on-street parking demand. Therefore, the effects of this alternative on alternative transportation would still be characterized as beneficial, but the intensity would be reduced to minor.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative A, except for potential cumulative impacts related to the Sir Francis Drake Boulevard Repaving Project. The County has tentatively planned to schedule the road repaving project in fall 2007 after hauling would be completed for the first phase of the proposed project (M. Madayag, County of Marin Department of Public Works, *pers. comm*.). However, hauling for the second phase of the proposed project would be more intense under Alternative C than under Alternatives A and B and could have an offsetting, minor adverse effect on conditions of the newly repaved portions of Sir Francis Drake Boulevard. The Park Service and CSLC would develop a monitoring program for 2008 to evaluate existing conditions of roads prior to start of hauling and would work with the County of Marin to ensure that truck loads remain within legal road limits.

.

Conclusions: Alternative C would generally have negligible to moderate effects on traffic, transportation, and road conditions in the local community. The most noticeable effects on traffic during the construction period would occur on lightly and moderately used local roadways such as Mesa Road, C Street, Mesa Road, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road, which would be subject to minor to moderate adverse impacts from hauling of excavated sediments to local quarries, trailering of construction equipment, and temporary traffic stops, road closures, and detours. During the seven (7) to eight (8) months of hauling of excavated sediments, construction-related traffic could decrease LOS on Levee Road and Pierce Point Road below their current estimated LOS of Level C and Level B, respectively, however, LOS would not below Level D, the County's minimum standard. Moderate impacts may result from temporary traffic stops and road closures associated with the West Pasture construction, construction of pedestrian bridge, and Olema Marsh restoration component, with the latter potentially requiring closure of Levee or Bear Valley Roads and alternate detours for anywhere from 3 to 14 days. Over the long-term, construction and expansion of public access facilities would result in negligible to minor adverse effects on traffic and parking demand from increased visitation, with impacts on the congested parking situation in western Point Reyes Station reduced by elimination of the C Street trail entrance. Relative to the other alternatives, this alternative would have reduced benefits for alternative transportation and connectivity between communities or neighborhoods due to a change in the trail entrance for southern perimeter trail at Point Reyes Station to a slightly less direct route and conversion of the eastern perimeter through-trail to spur trails.

Alternative D

Analysis: Alternative D would have very similar negligible to moderate effects on traffic and transportation in the local community as Alternative C (Table 91). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh, with expanded excavation and restoration efforts in the East Pasture. Under Alternative D, public access would be further scaled back through elimination of the bridge across Lagunitas Creek from project-level consideration and one of the spur trails on the eastern perimeter, although spur trails would be retained on the southern perimeter of the East Pasture, the northern perimeter of the railroad grade, and an ADA-compliant trail at White House Pool County park. Despite elimination of the bridge from project-level consideration, there would still be potential for a

southern perimeter trail, including a trail along Levee Road, possible extension of a trail to Inverness Park, and/or construction of a bridge across Lagunitas Creek, through a potential collaborative project with the County of Marin in the future.

Alternative D would have similar minor to moderate adverse effects on traffic in the local community during construction as described under Alternatives A - C. Relative to existing traffic conditions, construction would be expected to have minor to moderate adverse impacts on local arterial roadways such as Mesa Road, C Street, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road from hauling of excavated sediment, trailering of construction equipment, and commuting of construction personnel. Over the entire life of the proposed project, hauling would be expected to generate approximately 7,500 truck trips under Alternative D versus 6,275 truck trips under Alternative C. As the approach to disposal of excavated soils has not been defined yet, analyses assume a total of up to 40 truck roundtrips per day (80 single haul trips), with running of four (4) to five (5) trucks per day anticipated for a period of approximately six (6) to nine (9) months spread over two (2) construction seasons. Temporary increases in traffic during those six (6) to nine (9) months would range from 10 to 15 percent and cause LOS on Levee Road and Pierce Point Road to drop below their current estimated LOS of Level C and Level B, respectively, but LOS would not drop below Level D, the County's minimum standard. A much smaller volume of material (49 truck trips) would need to be hauled to a municipal landfill such as the Redwood Landfill in Petaluma, approximately 20-25 miles away, using other local roadways such as Point Reyes- Petaluma Road and Novato Boulevard.

As with Alternatives B and C, a small number of very temporary road closures may occur during construction on Sir Francis Drake Boulevard to allow for movement of construction equipment in and out of the West Pasture. In addition to temporary partial or full road closures required to replace Levee Road and Bear Valley Road culverts as part of the Olema Marsh restoration component, replacement of the Mesa Road culvert would also likely require partial to full closure of Mesa Road, respectively, for a period of three (3) to 14 days depending upon the restoration approach (i.e., replace culvert or construct bridge). Mesa Road is the main access road for several residential neighborhoods in the northern portion of Point Reyes Station. Should Mesa Road be fully closed on a temporary basis, residents would be required to access homes through the State Route 1 entrance, which would likely only have a negligible impact on detour times. These construction-related road closures would have minor to moderate effects on local traffic depending on the number of traffic stops, interruption of traffic flow through flagging and lane closure, duration of road closure, and length of detour.

Alternative D would have negligible to minor adverse effect on traffic and parking demands following implementation, but the intensity would be considerably reduced relative to Alternatives A, B, and C due to scaling back of expansion and improvement of public access facilities under this alternative. The bridge would be eliminated from project-level consideration under this alternative, resulting in Alternative D being really only an enhancement of existing public access facilities in the southern portion of the East Pasture and construction of an ADA-compliant trail and viewing area at the White House Pool County park. As with Alternative C, the trail entrance at C Street in Point Reyes Station would be eliminated, with all access to the southern perimeter trail occurring through an improved entrance to the Green Bridge County park near the Green Bridge. Scaling back of the eastern perimeter trail would continue with elimination of the Mesa Road spur trail, which would leave only the proposed extension of the Tomales Bay Trail. These changes would be expected to reduce the increase in traffic and parking demand relative to baseline conditions to negligible or, at the very most, minor. With elimination of the existing informal trail on the West Pasture north levee, peak traffic and parking conditions along Sir Francis Drake Boulevard would actually improve relative to baseline conditions, as heavy visitor use during the three to four periods of extreme high tides during the winter often cause traffic and parking problems along the Inverness Park portion of this road.

Elimination of the "through" components of both the southern and eastern perimeter trails would considerably reduce, if not entirely eliminate, the benefits of Alternative D to alternative transportation and connectivity between communities and neighborhoods relative to the Alternatives A, B, and C. Under this alternative, the Park Service would explore a potential collaboration with the County of Marin in the future on construction of on additional southern perimeter access options, including Levee Road, a possible extension of a trail to Inverness Park, and/or a pedestrian bridge at the location of the old summer dam. From a project-level perspective, the effects of this alternative on alternative transportation would probably be characterized as having no impact or, at the very most, a minor impact on quality of existing trail systems.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under Alternative C.

Conclusions: Alternative D would generally have negligible to moderate effects on traffic, transportation, and road conditions in the local community. The most noticeable effects on traffic during the construction period would occur on lightly and moderately used local roadways such as C Street, Mesa Road, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road, which would be subject to minor to moderate adverse impacts from hauling of excavated sediments to local quarries and temporary traffic stops, road closures, and detours. During the six (6) to nine (9) months of hauling of excavated sediments, construction-related traffic could decrease LOS on Levee Road and Pierce Point Road below their current estimated LOS of Level C and Level B, respectively, but LOS would not drop below Level D. Moderate impacts may result from temporary traffic stops and road closures associated with the West Pasture construction, replacement of the Tomasini Creek Mesa Road culvert, and the Olema Marsh restoration component, with the latter potentially requiring closure of Levee, Bear Valley, and Mesa Roads and alternate detours for anywhere from 3 to 14 days. Scaling back of expansion and improvement of public access facilities under this alternative would reduce the intensity of the proposed project's effects on traffic and parking demand from increased visitation to negligible or, at most, minor. Relative to the other alternatives, this alternative would have considerably reduced and potentially no benefits for alternative transportation and connectivity between communities or neighborhoods due to elimination of the "through" trail components for both the southern and eastern perimeter trails.

Visitor and Resident Experience – Public Access Resources

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

For the Park Service, "providing opportunities for appropriate public enjoyment is an important part of the Service's mission" (NPS 2006, Section 8.1). From the Park Service perspective, public education and enjoyment are integral components of the wetland restoration process: "When practicable, the Service will not simply protect, but will seek to enhance, natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions" (NPS 2006, Section 4.6.5).

Marin County, the LCP, and the Community Plan also actively support enhancement of public access and recreation. Within the Coastal Zone, the LCP (Marin County Comprehensive Planning Department 1981) encourages enhancement of public recreational opportunities and the development of visitor-serving facilities in its coastal zone, as long as it "preserves the unique qualities of Marin's coast and … is consistent with the protection of natural resources and agriculture." The LCP (Marin County Comprehensive Planning Department 1981), *Marin County Unincorporated Area Bicycle and Pedestrian Master Plan* (Alta Transportation Consulting 2001), and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) support exploration of the feasibility of creating an East/West Greenway along the railroad-right-of-way and the concept of bike and pedestrian trail network in the West Marin area. While facilitating public use, enjoyment, and appreciation of bayfront lands, projects should, however, "avoid or minimize disturbance to wetlands, necessary buffer areas, and associated important wildlife habitat" (Marin County Comprehensive Planning Department 1981). Both the LCP (Marin County Comprehensive Planning Department 1981) and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001) have established policies against development of the Point Reyes Mesa bluff area above the railroad-right-of-way in the Giacomini Ranch East Pasture through setbacks.

Both the Architectural Barriers Act of 1968 (PL90-480) and the Americans with Disabilities Act (ADA) of 1990 (PL 101-336) help to ensure that buildings and other facilities meet set standards to make them accessible to all visitors, including those with disabilities. The Park Service complies with ADA standards and requires that walks or paths that connect to accessible features need to be made accessible and that key features in the park need to be made accessible. However, paths need to be kept consistent with preserving the natural and cultural resources of the park, if the same experience can be provided on some portion of the alignment or a different trail. Standards for outdoor recreational facilities are often guided by recommendations from a report issued in September 1999 by a Regulatory Negotiation Committee convened by the Architectural and Transportation Barriers Compliance Board (Access Board) to help guide development of guidelines for facilities such as trails, boating and fishing facilities, parks, and sports facilities. California has also developed handicap access standards through California Building Code, Title 24 regulations, although the Title 24 standards are intended for urban facilities and not necessarily rural and park-type trails.

Significance criteria related to public access developed by the state and county under CEQA focuses on the potential for the proposed project to: 1) include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment; 2) substantially increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; 3) substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses; and 4) include provisions for pedestrian and bicycle circulation and motorcycle parking and security.

General Assumptions and Methodologies

- The proposed project has the potential to affect visitor and resident experience during both construction and implementation of the proposed project.
  - Construction has the potential to adversely affect, at least temporarily, the visitor and resident experience by limiting or increasing the difficulty of access to public access facilities both in the Project Area and in other areas of the park and Point Reyes region and by disrupting the subjective quality of the visitor and resident experience in the Project Area and vicinity.
  - Implementation of the proposed project has the potential to cause both beneficial and adverse impacts to visitor and resident experience resources through potential closure of existing trails and facilities and/or construction of new trails and facilities.
  - Implementation of the proposed project has the potential to have both beneficial and adverse effects on public safety through siting of trails, trailheads, parking, crosswalks, sidewalks, and other design features. Potential impacts on public safety related to geologic hazards are addressed under Geologic Resources.
  - Implementation of the proposed project has the potential to affect use of existing regional parks that could adversely affect routine maintenance and overall physical condition of public access facilities.
- This section separately evaluates potential effects on the visitor and resident experience during the construction and project implementation phases of the proposed project. The potential for construction to affect traffic or road delays is specifically addressed under Traffic and Transportation: this impact indicator more qualitatively evaluates how potential impacts might affect the overall visitor and resident experience.
- In addition, this section evaluates how the proposed project could affect public safety and facilities owned and maintained by other agencies such as County of Marin Parks and Open Space District.
- For this analysis, alternative transportation routes or segments of routes that connect communities or community commercial and residential areas are differentiated from public access facilities intended to allow visitors and residents to experience the natural resources of the region through attractions and uses. For this reason, alternative transportation is addressed under Public Services – Traffic and Transportation.

Described below are methodologies for impact indicators related to visitor and resident experience resources, including specific assumptions or details on methodologies.

Public Access Resources – Construction-Related Effects: Impact thresholds for construction-related impacts to visitor and resident experience focus on the potential for noise, traffic, and closures caused by construction to adversely affect the visitor and resident experience in the Project Area and in other areas of the park and Point Reyes region. To establish a broad range of intensities for potential effects, the thresholds qualitatively address a number of factors, including the projected length of time that construction might restrict access to facilities and the effects of construction noise and traffic on the subjective quality of the visitor and residence experience (Table 92). The potential for construction to increase traffic or road delays is specifically addressed under Traffic and Transportation: this impact indicator more qualitatively evaluates how potential impacts might affect the overall visitor and resident experience, although some traffic-related criteria are incorporated.

TABLE 92. PUBLIC ACCESS RESOURCES – CONSTRUCTION-RELATED EFFECTS

Source: Park Service Management Policies, Marin CWP, Point Reyes Station Community Plan, LCP Zone II **Nature**: Adverse **Context**: Project Area/Local Community, Regional (Seashore North District) **Duration**: Construction	
No Impact	There would be no potential for impact to visitor and resident experience in the Point Reyes area associated with construction of the proposed project.

TABLE 92. PUBLIC ACCESS RESOURCES – CONSTRUCTION-RELATED EFFECTS

Negligible	There would be barely detectable changes to access or enjoyment of public access facilities both inside and outside of the Project Area such that traffic or road delays caused by construction would be perceived by visitors as negligible. That is, visitors and residents using public access facilities would barely be able to detect a change in vehicle numbers or traffic patterns on arterial roadways. Temporary road closure events on sole access arterial roadways would never exceed 5 minutes, and temporary road closure events on alternate access arterial roadways that require detours would not be expected to exceed 48 hours. Visitors and residents using existing public access facilities in the Project Area and immediate vicinity would be only barely aware of construction activities, and access to facilities would be restricted during ≤ 10 percent of the year.
Minor	There would be measurable changes to access or enjoyment of public access facilities both inside and outside of the Project Area such that traffic or road delays caused by construction would be present, but relatively minor. That is, visitors and residents using public access facilities would perceive a measurable change in vehicle numbers or traffic patterns on arterial roadways, but it would not detract appreciably from visitor and resident enjoyment. Temporary road closure events on sole access arterial roadways would never exceed 15 minutes, and temporary road closure events on alternate access arterial roadways that require detours would not be expected to exceed 1 week. Visitors and residents using existing public access facilities in the Project Area and immediate vicinity would be aware of construction, but noise and activities would only result in a minor disruption to access and enjoyment such that access to facilities would be restricted, and/or construction would be apparent, but not disruptive, during ≤ 25 percent of the year.
Moderate	There would be appreciable changes to access or enjoyment of public access facilities both inside and outside of the Project Area such that traffic or road delays caused by construction would be moderate. That is, visitors and residents using public access facilities would perceive an appreciable change in vehicle numbers or traffic patterns on arterial roadways that would detract somewhat from visitor and resident enjoyment. Temporary road closure events on sole access arterial roadways would never exceed 30 minutes, and temporary road closure events on alternate access arterial roadways that would require detours would not be expected to exceed 4 weeks. Visitors and residents using existing public access facilities in the Project Area and immediate vicinity would be moderately aware of construction activities, and noise and activities would result in an appreciable disruption to access and enjoyment such that access to facilities would be restricted, and/or construction noise would be somewhat disruptive during ≤ 50 percent of the year.
Major	There would be striking changes to access or enjoyment of public access facilities both inside and outside of the Project Area such that traffic or road delays caused by construction would be major or substantial. That is, visitors and residents using public access facilities would perceive a striking change in vehicle numbers or traffic patterns on arterial roadways that would detract substantially from visitor and resident enjoyment. Temporary road closure events on sole access arterial roadways would exceed 30 minutes, and temporary road closure events on alternate access arterial roadways would be expected to exceed 4 weeks. Visitors and residents using existing public access facilities in the Project Area and immediate vicinity would be highly aware of construction activities, and noise and activities would result in a substantial disruption to access and enjoyment such that access to facilities would be restricted, and/or construction noise would be highly disruptive during > 50 percent of the year.

Public Access Resources – Project-Related Effects: Impact thresholds focus on changes in the number of structures, facilities, and attractions/uses that would be available as visitor and resident experience resources in the Project Area and immediate vicinity. To establish a broad range of intensities in effect, the number of potential future public access structures, facilities, and attractions/uses under the various alternatives is compared with the existing number of structures, facilities, and attractions/uses under baseline conditions (Table 93). Public access structures, facilities, and attractions/uses incorporate features such as visitor centers; bathrooms; parking; horse parking; water; trails; enhanced trails (including ADA-compatible facilities); and phones and attractions/uses such as biking; equestrians; dog walking, birdwatching; beach; fishing; swimming; wildflowers; whale watching; elephant seal observations, and trailheads for backpacking, etc. A simple weighting system is incorporated to reflect that the value to visitors and residents of structures, facilities, and attractions/uses associated with trails is often linked to some extent with its design as a loop, through-, or spur trail.

TABLE 93. PUBLIC ACCESS RESOURCES – PROJECT-RELATED EFFECTS

Source: Park Service Management Policies, Marin CWP, Point Reyes Station Community Plan, LCP Zone II **Nature**: Beneficial, Adverse **Context**: Project Area/Local Community **Duration**: Long-Term	
No Impact	There would be no potential for impact to visitor and resident experience resources in the Project Area and immediate vicinity associated with implementation of the proposed project.

TABLE 93. PUBLIC ACCESS RESOURCES – PROJECT-RELATED EFFECTS

Negligible	The proposed project would generate a negligible change (<10 percent) in public access structures, facilities, ADA-compliant facilities, and attractions/uses in the Project Area and immediate vicinity.
Minor	The proposed project would generate a minor change (>10 percent and ≤ 25 percent) in public access structures, facilities, ADA-compliant facilities, and attractions/uses in the Project Area and immediate vicinity.
Moderate	The proposed project would generate a moderate or appreciable change (> 25 and ≤ 50 percent) in public access structures, facilities, ADA-compliant facilities, and attractions/uses in the Project Area and vicinity.
Major or Substantial	The proposed project would generate a major or substantial change (>50 percent) in public access structures, facilities, ADA-compliant facilities, and attractions/uses in the Project Area and immediate vicinity.

Public Access Resources – Public Safety: Impact thresholds focus on changes in the number of structures and facilities that would have more than a minor potential for adverse impacts to public safety relative to existing conditions (Table 94). Public access structures and facilities that could have impacts on public safety include trails, trailheads, trail connections, parking, crosswalks, sidewalks, viewing platforms/overlooks, bathrooms, and other design features. Minor adverse impacts would be defined as incorporation of a facility or structure that would 1) not be expected to increase the fatality rate to pedestrians, bicyclists, and equestrians to levels that would exceed recently reported injury and fatality rates for Marin County and/or 2) cause a measurable change in safety conditions or potential for injury relative to existing conditions. Between 1995-2005, the pedestrian fatality rate for Marin County averaged approximately 0.79 fatalities per 100,000 population, compared to 1.6 fatalities per 100,000 population in Sonoma County and 2.2 for California as a whole (National Highway and Transportation Safety Analysis NHTSA 2007). NHTSA did not report rates of fatal bicycle accidents for individual California counties, but California as a whole had a rate of 3.06 per million people (NHTSA 2004b). Many of the proposed public access structures and facilities actually represent enhancements or improvements of existing structure and facilities such as trails, trailheads, trail connections, bathrooms, or other features. For these facilities, the potential for the proposed project to affect public safety through increasing the rate of injury is evaluated relative to existing safety conditions. (As noted earlier, potential impacts on public safety related to geologic hazards are addressed under Geologic Resources.)

TABLE 94. PUBLIC ACCESS RESOURCES – PUBLIC SAFETY CONDITIONS

Source: CEQA Guidelines (California) **Nature**: Beneficial, Adverse **Context**: Project Area/Local Community **Duration**: Construction, Short-Term/Long-Term	
No Impact	There would be no potential for change in public safety relative to existing conditions associated with the proposed project.
Negligible	There would be potential for a barely detectable change in public safety relative to existing conditions associated with the proposed project in terms of non-fatal pedestrian or bicycle injury accidents. There would be no detectable change anticipated in estimated rates of fatality accidents relative to existing conditions and/or County fatality rates.
Minor	There would be potential for a measurable change (< 2 percent) in public safety relative to existing conditions associated with the proposed project in terms of non-fatal pedestrian or bicycle injury accidents. There would be potential for a barely detectable change (<1 percent) in estimated rates of fatality accidents relative to existing conditions and/or County fatality rates.
Moderate	There would be potential for an appreciable change (< 5 percent) in public safety relative to existing conditions associated with the proposed project in terms of non-fatal pedestrian or bicycle injury accidents. There would be potential for a barely detectable change (<1 percent) in estimated rates of fatality accidents relative to existing conditions and/or County fatality rates.
Major or Substantial	There would be potential for an appreciable change (> 5 percent) in public safety relative to existing conditions associated with the proposed project in terms of non-fatal pedestrian or bicycle injury accidents. There would be potential for a measurable or larger change (>1 percent) in estimated rates of fatality accidents relative to existing conditions and/or County fatality rates.

Public Access Resources –Effects on Facilities of Other Agencies: Under CEQA, project proponents are directed to assess whether the proposed project would cause a substantial increase in use of public access facilities owned and/or managed by other agencies such that substantial physical deterioration of the facilities would occur or be accelerated. The only facilities owned and/or managed by other agencies that could be affected are White House Pool and Green Bridge County parks, which are managed by the County of Marin Parks and Open Space District (County Parks). Currently, the White House Pool County and Green Bridge County parks

attract approximately 7,000 visitors annually (E. Hulme, County Parks, *pers. comm*.), which equates to, on average, approximately 20 people per day. Changes in the number of users associated with construction or implementation of the proposed project could have effects on the physical condition or in the amount of maintenance required for public access facilities. Based on maintenance and cyclic replacement needs for Seashore facilities, increased visitation rates were assumed not to have more than a negligible effect on the frequency of routine and flood-related trail maintenance. In addition, based on the relatively low number of existing users, substantially higher number of visitors would be required to cause or accelerate substantial physical deterioration of facilities. Increases in visitation would be expected to primarily affect routine facility maintenance such as portable toilet maintenance, trash pick-up and disposal, and replenishing of supplies such as dog bags.

As discussed in other sections of the document, changes in visitation associated with the proposed project was evaluated by estimating the number of potential users of public access-related facilities at each major destination point within the Project Area (i.e., southern perimeter trail, eastern perimeter trail, etc.) as low, medium, or high based on the number of public access-related structures, facilities, and attractions/uses that would be available for use, as well as the current number of users of existing facilities in the Project Area. For comparison purposes, projections took into account the recorded number of users of other structures, facilities, and attractions/uses within the Seashore at major destination points. As directed by Park Service NEPA guidelines, impact thresholds analyze potential within the context of a broad range of impact intensities. Impact thresholds focus on anticipated changes in the number of users of structures and facilities owned and maintained by other agencies, as well as on anticipated effects on routine facility maintenance relative to existing conditions (Table 95).

TABLE 95. PUBLIC ACCESS RESOURCES – EFFECTS ON FACILITIES OF OTHER AGENCIES

Source: CEQA Guidelines (California), Point Reyes Station Community Plan/Marin CWP **Nature**: Beneficial, Adverse **Context**: Project Area/Local Community **Duration**: Construction, Short-Term/Long-Term	
No Impact	There would be no potential for impact to public access facilities owned and/or managed by other agencies associated with construction or implementation of the proposed project.
Negligible	The proposed project would be anticipated to generate a barely detectable change (≤25 percent) in the amount of use of public access facilities of other agencies that would not be expected to affect physical condition of facilities or cause more than a negligible change in the amount of facility maintenance required.
Minor	The proposed project would be anticipated to generate a measurable change (≤50 percent) in the amount of use of public access facilities of other agencies that could have a measurable effect on the amount of facility maintenance required, but would have no more than a negligible effect on physical condition of facilities .
Moderate	The proposed project would be anticipated to generate an appreciable change (≤100 percent) in the amount of use of public access facilities of other agencies that could have an appreciable effect on the amount of facility maintenance required, but would have no more than a minor effect on physical condition of facilities.
Major or Substantial	The proposed project would be anticipated to generate a striking or substantial change (>100 percent) in the amount of use of public access facilities of other agencies that could have an appreciable or substantial effect on the amount of facility maintenance required and a substantial effect on physical condition of facilities.

Impact Analysis

TABLE 96. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR VISITOR AND RESIDENT EXPERIENCE - PUBLIC ACCESS RESOURCES

All impacts would be considered Project Area/Local Community and/or Regional (North District) and are separately analyzed for Construction and Short-Term/Long-Term.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Construction-Related Effects	Adverse-Negligible	Adverse- Minor	Adverse-Minor	Adverse-Moderate	Adverse-Moderate
Project-Related Effects	No Impact	Beneficial - Major	Beneficial - Major	Beneficial-Moderate	Beneficial - Minor
Public Safety Conditions	Adverse-Negligible	Adverse-Minor	Adverse-Minor	Adverse-Minor	Adverse-Negligible
Effects on Facilities of Other Agencies	Adverse-Negligible	Adverse-Minor	Adverse-Minor	Adverse-Minor	Adverse-Negligible

No Action Alternative

Analysis: The No Action Alternative would generally have no impact to negligible adverse effects on public access resources in the Project Area, local community, and region during construction and after implementation (Table 96). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities.

Construction-Related Effects: Adverse effects on public access resources in the Project Area, local community, and region during construction would be very negligible and come principally from disruption of the visitor and resident experience through factors such as noise on the Giacomini Ranch East Pasture levee trail during construction of the small wetland restoration/mitigation component in the East Pasture. Construction of this component would occur approximately over a two- to three-month period in the late summer-early fall during one construction year. Construction activity would not only potentially affect access to existing trails in the Project Area and immediate vicinity, but access to public access facilities in the Seashore's North District (e.g., Lighthouse, Chimney Rock, Tomales Point, Abbott Lagoon) and Tomales Bay State Park. Under the No Action Alternative, most of the impacts to transportation on state and local roadways during construction would occur on State Route 1, Mesa Road, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road and would not be expected to have more than more than a very negligible effect on access to other public access resources in the local community and region, specifically the north district of the Seashore and Tomales Bay State Park. No construction-related temporary road closures would be anticipated.

Project-Related Effects-General Description: There would be no project-related effects on public access resources in the Project Area and local community.

The Project Area and immediate vicinity currently incorporates approximately five (5) formal or informal trails or trail segments. Informal dirt paths have developed on the southern portion of the Giacomini Ranch East Pasture levee (0.32 mile) and the northern portion of the Giacomini Ranch West Pasture levee (0.28 mile) even before the Park Service bought the property. Formal dirt trails have been developed on the Martinelli Ranch north of Point Reyes Station (1.37-mile Tomales Bay Trail; Park Service – GGNRA), the White House Pool County Park (0.5 miles; WCB lands leased by County Parks and Open Space District), and the Olema Marsh Trail on the east of Olema Marsh (0.39 miles; Park Service – Seashore). The Giacomini Ranch East Pasture trail connects with another 0.5-mile trail network in the Green Bridge County Park (WCB lands leased by County Parks and Open Space District). There are no formal overlooks, viewing areas, or platforms or areas with interpretative exhibits in the Project Area or immediate vicinity. None of the trailheads have any facilities to support visitation in terms of bathrooms, water fountains, payphones, or other structures.

Project-Related Effects-Use: This alternative would be expected to have no or at most negligible adverse effects on the types of users allowed on existing public access trails and facilities, including dogs. Use of existing trails consists primarily of walking, dog walking, and birdwatching on the Giacomini Ranch and County park trails, with the 0.5-mile White House Pool County Park trail also being used for bicycles. The 1.37-mile Tomales Bay trail on the Martinelli Ranch primarily supports hikers. Although formal data on use of these trails do not exist, these trails are characterized as having very low, low, and low/medium number of users. All of the existing trails in the Project Area rank as very low (average of <50 people per day) in terms of use, including Tomales Bay Trail, Olema Marsh Trail, Giacomini Ranch West Pasture, Giacomini Ranch East Pasture, White House Pool county park, and Green Bridge County Park (E. Hulme, superintendent, Marin County Open Space and Park District, *pers. comm*.).

Under the No Action Alternative, dogs on-leash would continue to be allowed on the informal trail in the East Pasture. All dogs would be required to be on a 6-foot leash at all times (36CFR 2.15 (a) 2), and owners would be subject to fines for off-leash dogs. Dogs would not be allowed in any areas where they are not currently allowed. This would include all of the wetland and grassland areas that are not designated trails. Under the No Action Alternative, dogs would not be allowed on the north levee of the West Pasture, because of the trail's proximity to habitat for federally and state listed California clapper rail (*Rallus longirostris obsoletus*; FE, SE) and California black rail (*Laterallus jamaicensis coturniculus*; ST). If at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the East

Pasture informal trail could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1). In general, dogs would continue to be allowed in County park areas subject to current and future county policies.

Project-Related Effects-ADA-Compliant Access: There are currently no ADA-compliant facilities within the Project Area, and there would be no construction of ADA-compliant facilities under the No Action Alternative.

Public Safety Conditions: There would be no to extremely negligible effects on public safety conditions relative to existing conditions anticipated during construction and over the short-term as a result of implementation of this alternative. During construction of the wetland mitigation component, construction activities or areas that could pose a danger to visitors and residents would be located a considerable distance away from any trails or homes. Over the long-term, degradation of levees could increase the propensity of the Giacomini Ranch to flood, but trails are currently used on a weather-dependent basis, and users would have plenty of warning before water levels rose to conditions that might be considered dangerous. There is no flash flooding in this region. Similar to baseline or existing conditions, there would continue to be negligible to minor risks to public safety associated with use of the Olema Marsh trailhead on Levee Road, Green Bridge County park trailhead on State Route 1, the White House Pool County park trailheads on Levee Road and at White House Pool, the West Pasture north levee trail, and the connections between White House Pool County park and Olema Marsh Trail, and the Olema Marsh Trail and the trailhead on the south side of Bear Valley Road near the intersection with Limantour Road. Negligible risks to public safety assume that there would be no increase in injury or fatality rate associated with the proposed structure or facility relative to existing conditions or to County-wide injury or fatality rates, such that accidents, on average, would be expected no more frequently than once every 10 years.

Effects on Facilities of Other Agencies: There would be only very negligible effects, if any, expected on the amount of use of facilities owned and/or managed by other agencies and, therefore, on the facility maintenance needs and physical condition of facilities associated with this alternative. Currently, White House Pool County and Green Bridge County park are visited by approximately 7,000 people annually (E. Hulme, Marin County Parks and Open Space District, *pers. comm*.), which, on average, is approximately 20 people per day. Because there would continue to be only marginal connectivity between Park Service and County Park trails, the barely detectable increase in the number of visitors and residents anticipated in the Project Area would be expected to have only a very negligible effect on the number of users of County Park facilities. Therefore, this alternative would also have negligible effects on facility maintenance needs and no effect on physical condition of County Park facilities at White House Pool and Green Bridge County parks. Currently, Marin County Open Space and Park District (County Parks) currently conducts routine maintenance of White House Pool County park portable bathroom facilities and trashcans and inspects trails at White House Pool four (4) times per week and at the Green Bridge County park two (2) times per week (E. Hulme, County Parks, *pers. comm*.).

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There are no currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented. While the county has underscored the need for alternative transportation corridors in this portion of west Marin in its planning documents and has even identified some possible path locations, none of these proposals could be currently construed as reasonably foreseeable projects.

Conclusions: The No Action alternative would result generally in either no impact or negligible adverse effects on public access resources in the Project Area, local community, and region (Table 96). The most noticeable effect would come from potential disruption of the visitor and resident experience for users of the Giacomini Ranch East Pasture levee trail during the very short construction period (2-3 months) for the small wetland restoration/mitigation component in the East Pasture, largely through factors such as noise. There would be no project-related effects on public access resources, and there would be no ADA-compliant facilities, because none exist currently. This alternative would be expected to have no or at most negligible adverse effects on the types of users allowed on existing public access trails and facilities, including dogs. Facilities would continue to serve primarily hikers and dog-walkers, with limited bicycle use. There would be extremely negligible, if any, effects on public safety conditions or on the amount of use, facility maintenance

needs, and physical condition of public access owned and/or managed by other agencies associated with implementation of this alternative.

Alternative A

Analysis: Alternative A would generally have minor adverse to major beneficial effects on public access resources in the Project Area, local community, and region during construction and after implementation (Table 96). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

Construction-Related Effects: Adverse effects on public access resources in the Project Area, local community, and region during construction would be minor. Regrading of the southern portion of the East Pasture Lagunitas Creek bank and construction of the southern perimeter trail during two separate construction seasons would limit access to the Giacomini Ranch East Pasture levee trail, but access would be limited by construction activities during less than 25 percent of the construction year. Construction of the restoration component is estimated to take approximately five months or one construction season, while the public access component would be constructed after restoration is completed and is estimated to take an additional two construction seasons. In addition to restrictions on access, noise from restoration and construction activities in the southern portion of the East Pasture and possibly trucks on local roadways would also have the potential to disrupt the quality of the visitor and resident experience, particularly for users of the Giacomini Ranch East Pasture levee trail, Green Bridge County Park trail, and White House Pool County Park trail. Construction in the southern portion of the East Pasture would not be expected to extend beyond two months or 17 percent of the year. In addition, users of these trails are already exposed to a certain level of ambient noise from farm equipment and dairy operation; vehicles, motorcycles, and heavy trucks traveling on arterial roadways; and other ambient noise such as construction in adjacent towns.

Construction activity would not only potentially affect access to existing trails in the Project Area and immediate vicinity, but access to public access facilities in the Seashore's North District (e.g., Lighthouse, Chimney Rock, Tomales Point, Abbott Lagoon) and Tomales Bay State Park. Under Alternative A, most of the impacts to transportation on state and local roadways during construction would occur on State Route 1, C Street, Mesa Road, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road from commuting of construction personnel to and from the Project Area, trailering of construction equipment, and hauling of excavated sediments from the Project Area to local quarries on the Point Reyes Peninsula. No construction-related temporary road closures would be anticipated. This alternative would not be expected to have more than more than a very negligible effect on access to other public access resources in the local community and region, specifically the north district of the Seashore and Tomales Bay State Park.

Project-Related Effects-General Description and Use: Alternative A would have a major beneficial effect on public access resources in the Project Area and local community, increasing the number of structures, facilities, and attractions/uses available to visitors and residents by more than 50 percent. Two through-trails would be constructed on the southern and eastern perimeters of the East Pasture, replacing or enhancing five existing spur or through- trails either on or adjacent to the Project Area. Public access would also continue along the existing informal dirt path on the north levee of the West Pasture. With the exception of the informal dirt path on the north levee, all of these facilities would serve hikers, equestrians, and bicyclists: the informal dirt path on the Giacomini Ranch north levee would be open only to hikers. Dogs on-leash would be allowed only in areas where currently permitted or allowed.

The southern perimeter path would connect Point Reyes Station with the White House Pool County Park. A decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay. The trail would continue along the edge of the East Pasture and Lagunitas Creek bank as does the existing informal social path. The existing dirt path in the Green Bridge County Park would be maintained and would connect to the proposed trail. The approximately 2,600-foot created- and improved

trail from the Dairy Mesa would lead to a 200-foot, 8-foot-wide bridge on Lagunitas Creek at the location of the old summer gravel dam that the Giacominis used to install for irrigation purposes (Figure 8). On the north side, the trail would connect to the existing dirt path in the White House Pool County Park. Because of the potential for flooding during large storm events, use of this path would be weather-dependent. Length of the southern perimeter trail would total approximately 3,000 linear feet.

This through-trail would be expected to attract a medium to high number of pedestrians, bicyclists, and equestrians, particularly local residents in the towns of Inverness Park and Point Reyes Station. (Comparatively, Bear Valley Trail would be characterized as attracting a very high number of users). This trail links what is currently several disjunct trails such as the Giacomini Ranch East Pasture levee trail/Green Bridge County Park trail, White House Pool County Park trail, and the Olema Marsh trail, ultimately allowing at least indirect access between the town of Point Reyes Station and the Seashore's Bear Valley complex and trail system. Relative to baseline conditions, it would enhance existing public access resource values by offering better views of the restored wetland, Lagunitas Creek, and southern Tomales Bay and better opportunities for birdwatching through viewing areas on the Dairy Facility mesa and elevated structures such as the bridge. In addition to improving connectivity between the communities of Inverness Park and Point Reyes Station, this trail would have at least minor effects on safety for pedestrians and bicyclists commuting between the two villages.

The Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park by connecting to the existing informal path in the White House Pool County Park with a path along Sir Francis Drake that would either run alongside Sir Francis Drake Boulevard or move off the road at the southern end of the unrestored West Pasture onto a low-elevation boardwalk that would join back with Sir Francis Drake Boulevard in Inverness Park. This future component would improve connectivity and public safety for residents in Inverness Park. It could include a potential elevated overlook at White House Pool County Park that would connect to the existing parking lot with an ADA-compliant path. As was noted in Chapter 2, undercutting of the San Francis Drake Boulevard road berm by Lagunitas Creek at White House Pool would need to be addressed before the path could be extended to Inverness Park through construction of a cantilevered section of path or other option (LandPeople 2005). Similar to the southern perimeter trail, this portion of trail would serve primarily hikers and bicyclists, with equestrian use expected to be minimal.

A second through-trail would also be constructed on the historic railroad grade on the eastern perimeter of the East Pasture. The existing unimproved Tomales Bay Trail originates on Highway 1 and runs through GGNRA lands leased to the Martinelli family to Railroad Point. This new through-trail would be extended approximately 1,700 feet south along the historic and defunct railroad grade that runs along the eastern perimeter of the East Pasture at the base of the Point Reyes Mesa. Approximately 1,700 feet south of the existing terminus of the Tomales Bay Trail, a new improved trail, approximately 3,200 lineal feet in length, would be constructed through placement of a culverted earthen berm. At the southern end, the trail would connect to the paved ranch road that connects to Mesa Road and runs alongside the Giacomini Hunt Lodge, a house that was constructed by the Giacomini family and is under a 25-year Reservation of Use Agreement. Viewing areas would be constructed on the Tomales Bay Trail bluff and in the vicinity of the Giacomini Hunt Lodge. Up to five (5) parking spaces may be created at the junction of the railroad grade and Mesa Road. Length of the Eastern Perimeter Trail would total approximately 6,000 lineal feet.

This through-trail would be expected to attract a medium number of users, particularly local residents in the town of Point Reyes Station. This facility would serve hikers, equestrians, and bicyclists: the existing Tomales Bay Trail is already designated as a hiking and biking trail. This trail would enhance the quality of the public access resource experience of the existing Tomales Bay Trail by extending it and allowing direct access from the town of Point Reyes Station. Relative to baseline conditions, it would enhance existing public access resource values by offering better views of Tomasini Creek and better opportunities to observe the moderately high number of shorebirds and waterfowl that use the shallowly ponded area in the eastern portion of the East Pasture during the winter months.

Under Alternative A, dogs on-leash would continue to be allowed on the southern perimeter through-trail. All dogs would be required to be on a 6-foot leash at all times (36CFR 2.15 (a) 2), and owners would be subject to fines for off-leash dogs. Dogs would not be allowed in any areas where they are not currently allowed. This would include all of the wetland and grassland areas that are not designated trails. Under Alternative A, dogs would not be allowed on the north levee of the West Pasture, because of the trail's proximity to habitat for federally and state listed California clapper rail (*Rallus longirostris obsoletus*; FE, SE) and California black rail (*Laterallus jamaicensis coturniculus*; ST). If at some point in the future dogs are determined to be

negatively impact wildlife, including nesting or special status wildlife species, the East Pasture informal trail could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1). In general, dogs would continue to be allowed in County park areas subject to current and future county policies.

Project-Related Effects-ADA-Compliant Access: This alternative would measurably increase the number of ADA-compliant facilities relative to baseline conditions through ensuring that a portion of the southern perimeter trail is consistent with accessibility guidelines for outdoor developed areas issued by a special committee convened by the Access Board. The Access Board is responsible for developing ADA guidelines. A decomposed granite trail that would be compliant with these standards would be constructed from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay. This portion of the trail would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. In addition, as part of the potential future extension of the southern perimeter trail to Inverness Park, an elevated overlook compliant with ADA standards may be constructed at White House Pool County Park that would connect to the existing parking lot with an ADA-compliant path.

Public Safety Conditions: There would be negligible to minor adverse effects on public safety conditions relative to existing conditions associated with implementation of this alternative, but it would not substantially increase hazards to the public. During construction, construction activities or areas that could pose a danger to visitors and residents would be close to some existing trails – the southern perimeter trail in the East Pasture and the Green Bridge County park trails – but, as discussed above, the former would be temporarily closed during construction, and construction fencing could be set up to limit access to the Giacomini Ranch from the Green Bridge County park during this period. Similar to baseline or existing conditions, there would continue to be negligible risks to public safety associated with use of the West Pasture north levee trail. Negligible risks to public safety assume that there would be no increase in injury or fatality rate associated with the proposed structure or facility relative to existing conditions or to County-wide injury or fatality rates, such that accidents, on average, would be expected no more frequently than once every 10 years.

Risks to public safety might increase slightly relative to existing conditions from negligible to minor for some of the other facilities that would be maintained as is or improved. Minor risks assume that non-fatal injury rate could increase to one accident every five (5) years, with the facility expected to have no detectable effect (<1 percent) on the rate of fatality accidents reported in Marin County. The increased potential for a non-fatal accident or injury would result simply from an increase in the number of visitors and residents expected to use these existing or improved facilities because of the through-trail connectivity, not because of a hazardous design feature. The risk would also increase, because higher visitor and resident use would increase vehicle traffic on adjacent roads.

The limited length of the southern perimeter through-trail, however, suggests that the increase in numbers of visitors, residents, and cars would be relatively minor, even with restoration of the Giacomini Ranch to wetlands and improvement in public access facilities. Overall, this component would be expected to have no more than minor adverse impacts on public safety conditions in the Project Area relative to existing conditions.

While creation of a through-trail would decrease the potential for accidents relative to existing conditions by at least partially moving people off the road, access to the trail itself would need to occur on existing roads. Therefore, benefits to public safety could be offset by increased risk of pedestrian and bicycle conflicts with motor vehicles at trailheads such as the Green Bridge County park, Green Bridge trailhead, and the White House Pool County park trailheads associated with minor increases in visitation. Also, pedestrians and bicycles would be more likely to ride along the shoulders of Sir Francis Drake Boulevard and Levee Road to reach trailheads, as well as to cross busy streets. As discussed under Traffic and Transportation, this trail -- and increased use of existing trails such as the Olema Marsh trail due to better connectivity with other trails -- would be expected to increase vehicular traffic by approximately 4- to 10 percent in the immediate vicinity of the southern perimeter trail relative to baseline conditions. Vehicles routinely exceed posted speed limits on Levee Road, Bear Valley Road, State Route 1, and the portion of Sir Francis Drake Boulevard adjacent to the proposed trails. A crosswalk had originally been proposed for Levee Road near the eastern end of the White House Pool County park to improve through-trail connectivity and safety in the DEIS/EIR, but it has been eliminated from consideration in the FEIS/EIR on the basis of additional need and safety analyses.

The new trail on the eastern perimeter would be expected to have no more than a minor effect, as well, on

public safety, although, relative to existing conditions, this trail would not be expected to have a detectable effect on improving safety conditions. While trail facilities currently do not occur on the eastern perimeter, residents of Point Reyes Mesa do occasionally walk or bike along Mesa Road to reach downtown Point Reyes Station. There are currently no formal sidewalks on Mesa Road between Tomasini Creek and State Route 1, and the road shoulder is absent for moderate portions of this section of road. Vehicle traffic on this road is relatively light, because the road only services the rural residential neighborhood of Point Reyes Mesa, but vehicles routinely exceed the posted speed limit. Creation of a trailhead on Mesa Road near Tomasini Creek could increase risks to public safety by increasing the numbers of visitors and residents that walk between the trailhead and downtown Point Reyes Station. A small parking lot would be created at the trailhead to encourage trail users to drive and park at the trailhead, rather than walk along Mesa Road. In addition, the Park Service may post signs advising trail users that they walk along Mesa Road at their own risk.

Effects on Facilities of Other Agencies: This alternative would be expected to have a moderate impact on the amount of use of facilities owned and/or managed by other agencies, but would have no more than a negligible to minor effect on facility maintenance needs and physical condition of these facilities. The increase in connectivity between Park Service and County Park trails would have the potential to increase the average number of users of County park facilities, but the limited nature of these trails in terms of distance or length would make it unlikely that the average number of daily users would increase more than 100 percent (>20 additional people per day on average). Despite restoration of the wetland, this trail system would still be expected to attract primarily local residents more than park visitors, many of whom are interested in longer hikes or in specific destinations (e.g., Lighthouse). While this increase in use could increase facility maintenance needs, these facilities already receive routine maintenance four (4) times a week, so, relative to existing conditions, increased facility maintenance would be negligible. Some of these users may be equestrians, which would have more impact on trail and bridge surfaces and, thereby, cause at least a minor increase in the rate of deterioration of public access facilities. However, the projected increase in use would not be expected to result in or to accelerate "substantial physical deterioration of the facilities."

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative A would generally have minor adverse to major beneficial effects on public access resources in the Project Area, local community, and region. Most of the construction-related effects would result from very temporary restriction of access on the Giacomini Ranch East Pasture levee trail, as well as temporary disruption of the quality of the visitor and residence experience on this trail and adjacent ones through noise from construction activities in the East Pasture and trucks on local roadways. Effects on regional public access resources from traffic delays or increased traffic would be very negligible.

This alternative would have major beneficial effects on enhancement and construction of public access resources in the Project Area and local community, increasing the number of structures, facilities, and attractions/uses available to visitors and residents by more than 50 percent. It would also incorporate ADA-compliant access that would allow people with disabilities to view and enjoy the restoration project. Two through-trails would be constructed on the southern and eastern perimeters of the East Pasture, replacing or enhancing five existing spur or through- trails either on or adjacent to the Project Area. Public access would also continue along the existing informal dirt path on the north levee of the West Pasture. In addition, the Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail to Inverness Park. With the exception of the informal dirt path on the north levee, all of these facilities would serve hikers, equestrians, and bicyclists: the informal dirt path would be open only to hikers. Dogs on-leash would be limited to trails where they are currently allowed, such as the southern perimeter trail in the East Pasture and County park trails. There would be negligible to minor adverse effects on public safety conditions relative to existing conditions associated with implementation of this alternative, but it would not substantially increase or decrease hazards to the public. Most of the adverse effect on public safety would result simply from an increase in use of existing and improved facilities and in vehicular traffic that would offset to a large degree any improvements in safety offered by through-trail connectivity. This alternative could have a moderate effect on the amount of use of County Park facilities at White House Pool and Green Bridge County parks, but this increase in use would be expected to have no more than a negligible effect on

facility maintenance needs relative to existing conditions or not to result in or to accelerate "substantial physical deterioration of the facilities."

Alternative B

Analysis: Alternative B would have identical minor adverse to major beneficial effects as Alternative A on public access resources in the Project Area, local community, and region during construction and after implementation (Table 96). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

The primary differences between Alternatives B and A are that: 1) under this alternative, the West Pasture north levee would be removed, and the existing informal path would be replaced with a viewing area at the current trail entrance off Sir Francis Drake Boulevard; 2) the culverted berm portion of the eastern perimeter trail would be replaced with a low-elevation boardwalk; and 3) there may be a small number of temporary road closures during construction on Sir Francis Drake Boulevard.

Construction-Related Effects: Construction effects would be very similar to those described under Alternative A. During construction, a small number of very temporary road closures may occur on Sir Francis Drake Boulevard to allow for movement of construction equipment in and out of the West Pasture, however, construction activities would primarily occur during the weekdays and should, therefore, not have more than a minor effect on visitor access to portions of the park on the Point Reyes Peninsula.

Project-Related Effects-General Description: Project-related effects would be very similar to Alternative A, with a few exceptions as noted above. In general, the West Pasture levee spur trail is only infrequently used by a very low number of pedestrians. The trail is relatively short (0.3 miles) and primarily offers low-elevation views of the undiked marsh north of Giacomini Ranch, Lagunitas Creek, the West Pasture of the Giacomini Ranch, and the surrounding sloped areas of the Inverness Ridge and the Point Reyes Mesa. However, during portions of at least three to four weeks every winter, this trail receives heavy use from hundreds of bird-watchers interested in seeing California black rails (*Laterallus jamaicensis coturniculus*; ST), which are very secretive birds that are rarely visible except when they move to upland refugia areas such as the levees during extreme high tides and flooding each winter. Some of these birdwatchers come from hundreds of miles away to view these unusual and interesting birds. During high tides, birdwatchers crowd onto the narrow levee, typically stringing out in small groups along its length. Replacement of the existing levee trail with a viewing area would considerably decrease the attractiveness of this particular location for "birders" interested in viewing rails, because, relative to existing conditions, the viewing area would offer less direct viewing opportunities. There are no other areas within Tomales Bay currently that support rails, so birdwatchers would either have to settle for easily accessible, but less "direct" viewing locations such as the West Pasture viewing area or hike out to the end of the 1.37-mile Tomales Bay Trail. Over the long-term, the eastern perimeter trail may offer some viewing opportunities if the rail population moves into the restored salt marsh habitat at the northern end of the East Pasture. Even with this reduction in facilities and attractions/uses, Alternative B still rates as having major beneficial effects on public access resources.

Replacement of the culverted berm portion of the eastern perimeter trail would have only negligible effects on the quality of public access resources offered by this park facility. Boardwalks sometimes pose problems for horses, but, under this alternative, a special coating may be applied to increase traction for horses that would also muffle sound. The boardwalk would be very low to the ground, so there should be no difficulty with access.

Project-Related Effects-ADA-Compliant Access: Similar to Alternative A, this alternative would have measurably increase the number of ADA-compliant facilities relative to baseline conditions through ensuring that a portion of the southern perimeter trail is consistent with accessibility guidelines for outdoor developed areas issued by a special committee convened by the Access Board. The Access Board is responsible for developing ADA guidelines.

Public Safety Conditions: The effects of Alternative B would be almost identical to those described under

Alternative A. Because the West Pasture would be restored under this alternative, there would be the potential for some additional increased risks to public safety during construction associated with the proximity of construction zones and staging and stockpile areas to private residences. During construction, construction fencing could be set up to limit access to construction zones and staging and stockpile areas.

Effects on Facilities of Other Agencies: The effects of Alternative B would be identical to those described under Alternative A.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative B would identical minor adverse to major beneficial effects as Alternative A on public access resources in the Project Area, local community, and region. Most of the construction-related effects would result from very temporary restriction of access on the Giacomini Ranch East Pasture levee trail, as well as temporary disruption of the quality of the visitor and residence experience on this trail and adjacent ones through noise from construction activities in the East Pasture and trucks on local roadways. Effects on regional public access resources from traffic delays or increased traffic would be very negligible.

This alternative would have major beneficial effects on enhancement and construction of public access resources in the Project Area and local community, increasing the number of structures, facilities, and attractions/uses available to visitors and residents by more than 50 percent. It would also incorporate ADA-compliant access that would allow people with disabilities to view and enjoy the restoration project. Two through-trails would be constructed on the southern and eastern perimeters of the East Pasture, replacing or enhancing five existing spur or through- trails either on or adjacent to the Project Area. In addition, the Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail to Inverness Park. The informal dirt path on the north levee of the West Pasture would be replaced with a viewing area due to the fact that the West Pasture levee would be removed, which would adversely affect a limited number of existing users – birdwatchers who come during some portion of the three or four extreme high tide events each winter to view California black rails that are seeking refugia in upland areas such as the levees. However, even with loss of this facility and a reduction in attraction/uses in this area, Alternative B would still result in major beneficial effects on public access resources, with trail facilities serving hikers, equestrians, and bicyclists. Dogs on-leash would be limited to trails where they are currently allowed, such as the southern perimeter trail in the East Pasture and County park trails. There would be negligible to minor adverse effects on public safety conditions relative to existing conditions associated with implementation of this alternative, but it would not substantially increase – or decrease -- hazards to the public. Most of the effects on public safety conditions would result from an increase in use of existing and improved facilities and in vehicular traffic that would offset any benefits to public safety from through-trail connectivity. This alternative could have a moderate effect on the amount of use of County Park facilities at White House Pool and Green Bridge County parks, but this increase in use would be expected to have no more than a negligible effect on facility maintenance needs relative to existing conditions or not to result in or to accelerate "substantial physical deterioration of the facilities."

Alternative C

Analysis: Alternative C would generally have both moderate adverse and beneficial effects on public access resources in the Project Area, local community, and region during construction and after implementation (Table 96). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. In Olema Marsh, an adaptive restoration approach would be undertaken through fill excavation and possible culvert replacement to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Construction-Related Effects: Adverse effects on public access resources in the Project Area, local community, and region during construction would be moderate. Regrading of the southern portion of the East Pasture Lagunitas Creek bank and construction of the southern perimeter trail during two separate construction seasons would limit access to the Giacomini Ranch East Pasture levee trail and the Olema Marsh Trail, but access would be limited by construction activities during less than 25 percent of the two construction years. Construction of the restoration component would occur over a total of 10 months broken into two construction seasons, while the public access component would be constructed after restoration is completed and would be expected to take two construction seasons. In addition to restrictions on access, noise from restoration and construction activities in the southern portion of the East Pasture and possibly trucks on local roadways would also have the potential to disrupt the quality of the visitor and resident experience, particularly for users of the Giacomini Ranch East Pasture levee trail, Olema Marsh Trail, Green Bridge County Park trail, and the White House Pool County Park trail. Construction in the southern portion of the East Pasture would not be expected to extend beyond four months or 30 percent of the year. In addition, users of these trails are already exposed to a certain level of ambient noise from farm equipment and dairy operation; vehicles, motorcycles, and heavy trucks traveling on arterial roadways; and other ambient noise such as construction in adjacent towns.

Construction activity would not only potentially affect access to existing trails in the Project Area and immediate vicinity, but access to public access facilities in the Seashore's North District (e.g., Lighthouse, Chimney Rock, Tomales Point, Abbott Lagoon) and Tomales Bay State Park. Under Alternative C, most of the impacts to transportation on state and local roadways during construction would occur on State Route 1, C Street, Mesa Road, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road from commuting of construction personnel to and from the Project Area, trailering of construction equipment, and hauling of excavated sediments from the Project Area to local quarries on the Point Reyes Peninsula. As with Alternative B, a small number of very temporary road closures may occur during construction on Sir Francis Drake Boulevard to allow for movement of construction equipment in and out of the West Pasture, but most of these closures would occur on weekdays, which should minimize impacts during some of the highest visitation periods. In addition, replacement of either or both the Levee Road culvert and the Bear Valley Road culvert as part of the Olema Marsh restoration component would likely require partial to full closure of Levee Road and Bear Valley Road, respectively, for a period of three days to several weeks depending upon the restoration approach (i.e., replace culvert or construct bridge). Both Bear Valley and Levee Roads serve as important links to Sir Francis Drake Boulevard, the only road connecting the "mainland" portion of Marin County to the northern portions of the Seashore and the Tomales Bay State Park that occur on the Point Reyes Peninsula. Replacement of these culverts with either improved culverts or bridges would not be undertaken simultaneously, so traffic could be rerouted onto one or the other of these two key arterial roadways. Should Levee Road be fully closed on a temporary basis, a detour or alternate route to Sir Francis Drake Boulevard using State Route 1 and Bear Valley Road would add approximately 5 minutes to the commute time. The potential for road closures and detours increases the potential effect of this alternative relative to the other alternatives on public access resources in the vicinity of the Project Area and on the Point Reyes Peninsula from minor to moderate.

Project-Related Effects-General Description: Alternative C would have slightly less benefits for public access resources in the Project Area and local community than Alternatives A and B by increasing the number of structures, facilities, and attractions/uses available to visitors and residents by slightly less than 50 percent. The southern and eastern perimeter facilities would continue to serve hikers, equestrians, and bicyclists, but no through-trail opportunities would be offered on the eastern perimeter. Dogs on-leash would be limited to trails where they are currently allowed, such as the southern perimeter trail in the East Pasture and County park trails. This would include all of the wetland and grassland areas that are not designated trails. If at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the East Pasture informal trail could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1). In general, dogs would continue to be allowed in County park areas subject to current and future county policies.

As with Alternatives A and B, a southern perimeter through-trail would be constructed on the southern perimeter of the East Pasture, replacing or enhancing at least existing spur or through- trails either on or adjacent to the Project Area. However, the Point Reyes Station entrance to the trail would be switched from 3rd and C Street, where it is located under Alternatives A and B, to an improved entrance in the Green Bridge County Park adjacent to the Green Bridge. While the entrancewould be formally switched, some people would probably continue to informally access trails from 3rd and C Street, because it is the existing access point and is the closest access point from downtown Point Reyes Station. The Park Service would continue to maintain an administrative access road with gate at this location. The trail starting at the Green Bridge would

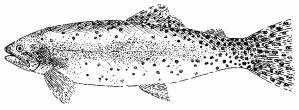
continue to connect to the eastern perimeter trail that leads either to the bridge or follows the edge of the mesa to the viewing area described under Alternative A, but the path would not be constructed as an ADA-compliant trail. The ADA-compliant trail would be constructed on the eastern perimeter of the East Pasture under this alternative. As was discussed under Traffic and Transportation, relocating the Point Reyes Station entrance would have some impacts on the value of this trail for alternative transportation purposes, although from a public access resource viewpoint, it would continue to offer many of the same attractions/uses in terms of views, birdwatching opportunities, etc. The bridge would still provide linkages with the White House Pool County Park and Olema Marsh trails, and the Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail to Inverness Park.

In addition, under Alternative C, the eastern perimeter through-trail would be converted to two spur-trails. One spur trail would extend approximately 1,700 feet south from the terminus of the Tomales Bay Trail along the historic and defunct railroad grade that runs along the eastern perimeter of the East Pasture at the base of the Point Reyes Mesa. The other spur trail would be an ADA-compliant feature at the southern end of the railroad grade where it intersects with Mesa Road. From the small five-car parking area, an improved trail would be constructed to the viewing area in the vicinity of the Giacomini Hunt Lodge, a house that was constructed by the Giacomini family and is under a 25-year Reservation of Use Agreement. These spur trails would be expected to attract a lower number of users than a through-trail, because it decreases connectivity between neighborhoods and direct access to the Tomales Bay Trail from Point Reyes Station. However, the spur trails would still enhance existing public access resource values by offering better views and more opportunities to observe the moderately high number of shorebirds and waterfowl that use the shallowly ponded area in the eastern portion of the East Pasture during the winter months than under baseline conditions. In view of these changes, the benefits of Alternative C to public access resources are somewhat reduced relative to Alternatives A and B, with effects characterized as moderate beneficial.

Project-Related Effects-ADA-Compliant Access: This alternative would increase the number of ADA-compliant facilities relative to baseline conditions. Because the Point Reyes Station trailhead would be relocated to the Green Bridge, the ADA-compliant component of the southern perimeter trail would be eliminated. Instead, the Mesa Road spur trail would be improved so that it would be consistent with guidelines recommended under the Outdoor Recreation Standards. This portion of the trail would be constructed with decomposed granite and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. It would connect to a viewing area near the Giacomini Hunt Lodge that would allow the public to experience and enjoy the restoration project and views of the southern portion of Tomales Bay. In addition, as part of the potential future extension of the southern perimeter trail to Inverness Park, an elevated overlook compliant with ADA standards may be constructed at White House Pool County Park that would connect to the existing parking lot with an ADA-compliant path.

Public Safety Conditions: As with Alternatives A and B, there would be negligible to minor adverse effects on public safety conditions relative to existing conditions associated with implementation of this alternative, but it would not substantially increase hazards to the public. In general, most of the impacts to public safety conditions would be identical to those discussed under Alternative A. During construction, some additional trails such as the Olema Marsh Trail may need to be temporarily closed to ensure public safety, because of restoration activities in Olema Marsh and adjacent to Olema Creek. As discussed under Alternative A, risks to public safety might increase slightly relative to existing conditions for some of the facilities that would be maintained as is or improved, because of an increase in the number of users and/or in the amount of vehicular traffic generated on adjacent roads. While creation of a through-trail would decrease the potential for accidents relative to existing conditions, access to the trail itself would need to occur on existing roads. Therefore, benefits could be offset by increased risk of pedestrian and bicycle conflicts with motor vehicles at trailheads and along more heavily trafficked roads.

Under Alternative C, the Point Reyes Station trailhead would be moved from its existing location at 3rd and C Street to the Green Bridge, and the existing Green Bridge entrance would be improved. These actions could increase risks to public safety relative to existing conditions by routing more people using the southern perimeter trail along the north side of State Route 1, which has no formal sidewalk and little road shoulder between the Green Bridge and B Street in downtown Point Reyes Station. In addition, the risk would also increase, because higher visitor and resident use would increase in vehicle traffic on adjacent roads. As discussed under Traffic and Transportation, this trail --and increased use of existing trails such as the Olema Marsh trail due to better connectivity with other trails -- would be expected to increase vehicular traffic by approximately 4- to 10 percent in the immediate vicinity of the southern perimeter trail relative to baseline conditions. Relocation of the Point Reyes southern perimeter trailhead to an improved Green Bridge entrance would be expected to have at least a minor adverse effect on public safety relative to existing conditions.



Minor risks assume that non-fatal injury rate could increase to one accident every five (5) years, with the facility expected to have no detectable effect (<1 percent) on the rate of fatality accidents reported in Marin County.

Conversely, elimination of the through-trail component on the eastern perimeter would be expected to reduce risks to public safety associated with conflicts between vehicles and pedestrian and bicycle traffic on Mesa Road relative to existing conditions. Elimination of the through-trail component would considerably reduce the number of users of this facility, which would now be an ADA-compliant spur trail to a viewing platform near the Giacomini Hunt Lodge Because of this, risks to public safety in this area would be expected to drop from minor under Alternatives A and B to negligible under Alternative C relative to existing conditions.

Effects on Facilities of Other Agencies: This alternative would have very similar effects on the amount of use, maintenance needs, and physical condition of facilities of other agencies as Alternatives A and B. However, relocation of the Point Reyes trailhead for the southern perimeter trail to the Green Bridge within the Green Bridge County park would increase the amount of use of Green Bridge County park trails and possibly have a minor effect on facility and trail maintenance needs relative to existing conditions. The Green Bridge County park does not have any formal facilities such as portable toilets, parking lots, or benches, but County Park staff visit the park twice a week to pick up trash and check and clear the trails (E. Hulme, County Parks, *pers. comm*.). While use of Green Bridge County park trails would increase relative to existing conditions, use of the southern perimeter trail may drop slightly relative to Alternatives A and B because of the decreased connectivity between Point Reyes Station and White House Pool County park. Therefore, only a minor increase in facility maintenance needs relative to existing maintenance conditions would still be expected, and, the projected increase in use of Green Bridge County park would not result in or accelerate "substantial physical deterioration of the facilities."

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative C would generally have both moderate adverse and beneficial effects on public access resources in the Project Area, local community, and region. Most of the construction-related effects would result from temporary road closures and detours because of the Olema Marsh restoration component. Construction activities could temporarily restrict access to the Giacomini Ranch East Pasture levee trail, as well as temporarily disrupt the quality of the visitor and residence experience on this trail and adjacent ones through noise from construction activities in the East Pasture, West Pasture, and Olema Marsh and trucks on local roadways.

This alternative would offer slightly less benefits than Alternatives A and B in terms of enhancement and construction of public access resources in the Project Area and local community, increasing the number of structures, facilities, and attractions/uses available to visitors and residents by less than 50 percent. The southern and eastern perimeter facilities would continue to serve hikers, equestrians, and bicyclists, but no through-trail opportunities would be offered on the eastern perimeter. Dogs on-leash would be limited to trails where they are currently allowed, such as the southern perimeter trail in the East Pasture and County park trails. The southern perimeter through-trail would still be constructed, but the entrance from Point Reyes Station would be moved to a location that provides less direct access, and there would be no ADA-compliant component. While the entrance would be formally switched, some people would probably continue to informally access trails from 3rd and C Street, because it is the existing access point and is the closest access point from downtown Point Reyes Station. This action could increase risks to public safety relative to existing conditions by routing more people using the southern perimeter trail along the north side of State Route 1, which has no formal sidewalk and little road shoulder between the Green Bridge and B Street in downtown Point Reyes Station. It could also increase the amount of use of Green Bridge County park trails and possibly have a minor effect on facility and trail maintenance needs relative to existing conditions, although it would not result in or to accelerate "substantial physical deterioration of the facilities." In general, there would be negligible to minor adverse effects on public safety conditions relative to existing conditions associated with implementation of this alternative, but it would not substantially increase – or decrease -- hazards to the public. Most of the effects on public safety conditions would result from an increase in use of existing and

improved facilities and in vehicular traffic that would offset any benefits to public safety from through-trail connectivity.

The non-vehicular bridge would still provide linkages with the White House Pool County Park and Olema Marsh trails, and the Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail to Inverness Park. The through-trail on the eastern perimeter would be converted to two spur trails, one of which would be ADA-compliant, and would offer the many of the same viewing and birdwatching opportunities, although there would be less connectivity between neighborhoods and no direct access to the Tomales Bay Trail from Point Reyes Station.

Alternative D

Analysis: Alternative D would generally have moderate adverse and minor beneficial effects on public access resources in the Project Area, local community, and region during construction and after implementation (Table 96). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all of the differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to intertidal elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and further scaling back of new public access facilities through elimination of the bridge across Lagunitas Creek from project-level consideration and one of the spur trails on the eastern perimeter. The public access component has been modified to some degree in the FEIS/EIR. An ADA-compliant trail, viewing platform, and vault toilet facility has been incorporated at White House Pool County park. The Park Service would also pursue working with the County of Marin in the future to evaluate additional public access facilities on the southern perimeter through a separate environmental analysis process, including reevaluation of a trail along Levee Road, extension of a trail to Inverness Park, and/or a non-vehicular bridge across Lagunitas Creek.

Project-Related Effects-General Description: Impacts on public access resources in the Project Area, local community, and region during construction would be identical to Alternative C. However, Alternative D would offer even less benefits for public access resources in the Project Area and local community than Alternative C, increasing the number of structures, facilities, and attractions/uses available to visitors and residents by only slightly more than 19 percent. These facilities would largely serve walkers and hikers, although they would be open to use by equestrians and bicyclists. Dogs on-leash would be limited to trails where they are currently allowed, such as the southern perimeter trail in the East Pasture and County park trails. This would include all of the wetland and grassland areas that are not designated trails. If at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the East Pasture informal trail could be closed through the Superintendent's Compendium process (36CFR 2.15 (a) 1). In general, dogs would continue to be allowed in County park areas subject to current and future county policies.

The southern perimeter through-trail would become more of an enhancement of the existing spur trails at the Giacomini Ranch East Pasture and Green Bridge County Park, with elimination of the bridge. As with Alternative C, the Point Reyes Station entrance to the trail would be formally switched from 3rd and C Street to an improved entrance in the Green Bridge County Park adjacent to the Green Bridge. While the entrance would be formally switched, some people would probably continue to informally access trails from 3rd and C Street, because it is the existing access point and is the closest access point from downtown Point Reyes Station. The Park Service would continue to maintain an administrative access road with gate at this location. The existing Giacomini Ranch East Pasture levee trail would be improved and extended along the edge of the mesa to the viewing area described under Alternative A. As was discussed under Traffic and Transportation, maintenance of a spur trail rather than construction of a through-trail would have impacts on the value of this trail for alternative transportation purposes, although from a public access resource viewpoint, it would continue to offer some of the same attractions/uses in terms of views, birdwatching opportunities, etc.

As noted above, under this alternative, the Park Service would explore working with the County of Marin in the future through a separate environmental analysis process on potentially expanding public access on the southern perimeter through additional facilities, including reevaluation of a trail along Levee Road, extension of a trail to Inverness Park, and/or a non-vehicular bridge across Lagunitas Creek as currently proposed in this document under Alternatives A-C.

In addition, under Alternative D, only one of the two spur-trails described under Alternative C would be

constructed. The Tomales Bay Trail would still be extended approximately 1,700 feet south from the terminus of the Tomales Bay Trail along the historic and defunct railroad grade that runs along the eastern perimeter of the East Pasture at the base of the Point Reyes Mesa. As with all the other action alternatives, a simple viewing area would be constructed at the top of the Tomales Bay Trail mesa. However, there would no Mesa Road spur trail, parking area, or viewing area in the vicinity of the Giacomini Hunt Lodge. Relative to Alternative C, enhancement of the Tomales Bay Trail would be expected to attract a lower number of users, although it would still enhance existing public access resource values by offering better views and more opportunities to observe the moderately high number of shorebirds and waterfowl that use the shallowly ponded area in the eastern portion of the East Pasture during the winter months than under baseline conditions. In view of these changes, the benefits of Alternative D to public access resources are even further reduced relative to the other action alternatives, with effects characterized as minor beneficial.

Project-Related Effects-ADA-Compliant Access: An ADA-compliant trail would be constructed from the White House Pool parking lot to the edge of Lagunitas Creek, where a slightly raised, ADA-compliant viewing platform would be placed. In addition, the existing portable toilet would be replaced with an ADA-compliant vault toilet with a ramp that would meet ADA standards in terms of grade and surfacing. Some of the parking spaces in the parking lot would be marked for handicapped use only. This component would have a beneficial effect on public access resources on public access resources.

Public Safety Conditions: Under Alternative D, there would be a slight decrease in the risks to public safety, primarily because of the elimination of the through-trail connection provided by the Lagunitas Creek bridge. Elimination of the through-trail connection could decrease the amount of visitors and residents that bike or walk along the narrow shoulders of Levee Road, Bear Valley Road, and Sir Francis Drake Boulevard and decrease the potential for conflict between motor vehicles and pedestrians and bicyclists at the White House Pool County park trailheads.

As with Alternative C, the Point Reyes Station trailhead for the southern perimeter spur trail would be relocated from its existing location at 3rd and C Street to the Green Bridge, and the existing Green Bridge entrance would be improved. These actions could increase risks to public safety relative to existing conditions by routing more people using the southern perimeter spur trail along the north side of State Route 1, which has no formal sidewalk and little road shoulder between the Green Bridge and B Street in downtown Point Reyes Station. However, the degree of risk would be lower than under Alternative C, because the number of users of this trail would be expected to be considerably reduced. In addition, elimination of the Mesa Road spur trail would also eliminate potential risks to public safety associated with conflicts between vehicles and pedestrian and bicycle traffic on Mesa Road. Because of these actions, risks to public safety under this alternative would be expected to drop from minor under Alternatives A - C to negligible under Alternative D relative to existing conditions, even with the decrease in safety conditions that might occur relative to existing conditions because of the elimination of through-trail connectivity.

Effects on Facilities of Other Agencies: Because of the elimination of the through-trail connection to White House Pool County park, this alternative would be expected to have only negligible effects on the amount of use of County park facilities and would not be expected to result in or to accelerate "substantial physical deterioration of the facilities." However, construction of ADA-compliant facilities at White House Pool County park and relocation of the Point Reyes Station trailhead for the southern perimeter through-trail to the Green Bridge County park could still result in a measurable or minor increase in facility maintenance needs relative to existing conditions. The latter is discussed more under Alternative C.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative D would generally have moderate adverse and minor beneficial effects on public access resources in the Project Area, local community, and region. Most of the construction-related effects would result from temporary road closures and detours because of the Olema Marsh restoration component. Construction activities could temporarily restrict access to the Giacomini Ranch East Pasture levee trail, as well as temporarily disrupt the quality of the visitor and residence experience on this trail and adjacent ones

through noise from construction activities in the East Pasture, West Pasture, and Olema Marsh and trucks on local roadways.

This alternative would offer considerably less benefits than Alternatives A, B, and C in terms of enhancement and construction of public access resources in the Project Area and local community, increasing the number of structures, facilities, and attractions/uses available to visitors and residents by slightly more than 19 percent relative to baseline conditions. No through-trails would be constructed, although there would be a potential for through-trail connectivity in the future through potential collaboration with the County of Marin on additional southern perimeter public access facilities through a separate environmental analysis process. Under Alternative D, the Giacomini Ranch East Pasture levee spur trail would be improved with an extension along the edge of the mesa to the viewing area near the Dairy facility. The existing Point Reyes Station entrance at 3rd and C Street would be relocated to a location that provides less direct access. While the entrance would be formally switched, some people would probably continue to informally access trails from 3rd and C Street, because it is the existing access point and is the closest access point from downtown Point Reyes Station. On the eastern perimeter, only one spur trail would be constructed, which would extend the Tomales Bay Trail approximately 1,700 feet. An ADA-compliant trail and slightly raised viewing platform would be constructed at White House Pool County park. These facilities would offer many of the same viewing and birdwatching opportunities as those offered under other alternatives, although there would be less connectivity between communities and neighborhoods and no direct access between Inverness Park and Point Reyes Station. Because of this, they would largely serve hikers, although they would be open to use by equestrians and bicyclists. Dogs on-leash would be limited to trails where they are currently allowed, such as the southern perimeter spur trail in the East Pasture and County park trails. The elimination of the through-trail component from project-level consideration under Alternative D would also slightly decrease risks to public safety and the effects on maintenance needs and physical condition of public access facilities of other agencies associated with the proposed project and would, therefore, not result in or accelerate "substantial physical deterioration of the facilities."

Visitor and Resident Experience – Visual Resources and Viewsheds

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

The Park Service Management Policies (2006) direct the agency to cause no impairment to park resources and values, including "scenery, scenic features, natural visibility, both in daytime and at night, and natural landscapes." Furthermore, NEPA guides federal agencies to evaluate the effects of proposed actions on the quality of the visual experience of the affected environment.

State Route 1 in Marin County is a state scenic highway under the CalTrans Scenic Highway Program. The *Guidelines for the Official Designation of Scenic Highways* (CalTrans 1996) states that scenic byways are protected from imposition of negative visual intrusions and that permanent degradation of the quality of views from the highway may result in removal of scenic designation. The LCP (Marin County Comprehensive Planning Department 1981) identifies stretches of Sir Francis Drake Boulevard, including the segment of road boarding the West Pasture, as providing a scenic driving experience for coastal visitors and notes that, "in order to protect its **scenic rural character**, the road shall be maintained as a two-lane roadway" (emphasis added).

The LCP for Zone II (Marin County Comprehensive Planning Department 1981) refers to visual resource protection policies in the Coastal Act that address the importance of protection of views to scenic resources from public roads, beaches, trails, and vista points. The *Marin Countywide Plan* (draft Countywide Plan 2005) mandates that visual and esthetic resources, especially scenic vistas, shall be protected by review of planned projects and removal of inconsistent existing elements. The County has developed two policies to protect visual and esthetic resources: the Viewshed Protection Policy protects visual access to the bay front and scenic vistas of water and distinct shorelines through its land use and development review procedures; the View Corridor and Enhancement Policy urges that existing built elements, such as overhead utilities should be eliminated or blended into the environment.

General Assumptions and Methodologies

- The proposed project would affect visual resources through physical and management changes to the existing landscape in the Giacomini Ranch and Olema Marsh, as well as through construction and operation of public access facilities.
- Visual resources are considered within three contexts using two widely-accepted protocols used for evaluating visual impacts of proposed projects: the Federal Highway Administration (FHWA) technical document *Visual Impact Assessment for Highway Projects* (Federal Highway Administration 1983) and the US Forest Service (USFS) *Landscape Aesthetics*: *A Handbook for Scenery Management* (USDA 1995):
  - Internal esthetics, will the proposed action create or maintain internally consistent visual resources?
  - Relational esthetics, will the proposed action create or maintain visual resources that fit into the local community?
  - Environmental esthetics, will the proposed action enhance the visual quality of the environment?
- The analysis assesses effects of the proposed project on the following Visual Resource elements adopted from the FHWA (1983):
  - ***Vividness***: memorability of landscape components;
  - ***Intactness***: visual integrity of the landscape and relative absence of visually encroaching elements;
  - ***Unity***: compositional harmony of landscape components and coherence of features within a scene.
- Air quality and visibility are evaluated under Air Resources – Air Quality.
- Impacts to natural lightscapes (dark night skies) are considered under Visual Resources.
- Visual resources were evaluated for the entire Project Area from a set of eight (8) vantage points representative of the range of viewsheds available of the Project Area from homes, roads, and walking paths. Views from these vantage points are assessed only in the direction of the Project Area.
- For each of these views, the present landscape character was described according to principles defined in FHWA (1983) and USDA (1995) and incorporated natural lightscape characteristics, as required by Park Service Management Policies. Baseline conditions wee then compared to project changes to the views under all the project alternatives (Table 97).

TABLE 97. VISITOR AND RESIDENT EXPERIENCE – VISUAL RESOURCES AND VIEWSHEDS

Source: NPS Management Policies (2001) **Nature**: Beneficial, Adverse **Context**: Project Area, Community **Duration**: Construction, Short-Term, Long-Term	
No Impact	There would be no change in the quality of visual resources within the Project Area. The visual quality of views of the Project Area from surrounding lands within the watershed would not change.
Negligible/Minor	Changes to the quality of visual resources within the Project Area and to views of the Project Area from surrounding lands would be detectable, but the landscape would have the ability to absorb and incorporate the majority of the changes without disruption of integrity, diversity, prospect or natural lightscapes.
Moderate	Changes to the quality of visual resources within the Project Area and to views of the Project Area from surrounding lands would be readily noticeable. One or more secondary features of the site would be altered, but would not disrupt the overall integrity, diversity, prospect or natural lightscapes of the visual resources.
Major or Substantial	Changes to the quality of visual resources within the Project Area and to views of the Project Area from surrounding lands would be highly noticeable and dramatic. The visual resources would have substantial change in overall integrity, diversity, prospect or natural lightscapes.

Impact Analysis

TABLE 98. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR VISUAL RESOURCES AND VIEWSHEDS

All impacts are analyzed for the Project Area and for views of the Project Area from vantage points within the Community.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Visual Resources – Construction	Adverse Negligible	Adverse Minor	Adverse Moderate	Adverse Moderate	Adverse Moderate
Visual Resources – Short-Term	Adverse Minor	Adverse Minor	Adverse Minor	Adverse Moderate	Adverse Moderate

TABLE 98. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR VISUAL RESOURCES AND VIEWSHEDS
All impacts are analyzed for the Project Area and for views of the Project Area from vantage points within the Community.

Long-term	Beneficial Minor	Beneficial Moderate	Beneficial Moderate	Beneficial Moderate	Beneficial Moderate

No Action Alternative

Analysis: The No Action Alternative would generally have negligible to minor effects on visual resources within the Project Area (Table 98). Under the No Action Alternative, a small portion of the East Pasture (~11 acres) is converted from pasture or diked brackish marsh into tidal salt marsh. Agricultural management practices would be discontinued, but agricultural infrastructure such as levees, power poles, roads, pipes, and culverts would not be removed. There would be a potential for leased grazing through a separate environmental review and permitting process. No new public access facilities would be constructed under this alternative.

Short-Term/Long-Term: Because of these actions, the No Action Alternative would either convert a highly managed Pastoral Landscape into largely a lightly managed Pastoral or Ruderal Landscape, depending on whether leased grazing is permitted under this alternative in the future. Under the No Action Alternative, grazing would likely cease or be continued at lower densities. If grazing continues, this would preserve much of the Pastoral Landscape qualities that are currently provided under baseline conditions, although the quality of this Pastoral Landscape would continue to be low, because the unsightly intrusion of manmade elements or agricultural infrastructure such as levees, roads, pipes, power poles, and pumphouses negatively affects the visual intactness and unity of this particular landscape. However, without maintenance, unnatural linear features such as roads, levees, and irrigation ditches would eventually become less visible due to degradation and colonization by annual grasses and weedy forbs. These changes would improve the intactness and unity of visual resources, which would be visible from vantages such as the Inverness Ridge, West Pasture North Levee, White House Pool County Park, Point Reyes Station C Street, the Hunt Lodge East Pasture, and the Tomales Bay Trail.

Within most of the Giacomini Ranch, discontinuation or a reduction in grazing pressure, along with elimination of agricultural management practices such as manure spreading, would cause a sharp, temporary increase in the areal extent or cover of weedy species such as common velvetgrass (*Holcus lanatus*), poison hemlock (*Conium maculatum*), bull thistle (*Cirsium vulgare)* and milk thistle (*Silybum marianum*). In addition, discontinuation of irrigation would convert the artificially green pastures in the East Pasture into brown grasslands during the summer. Over the short-term, these changes would negatively affect visual quality of the Project Area by converting it into a Ruderal Landscape and thereby decreasing the vividness, intactness, and unity of visual resources.

Natural Landscapes, characterized by unmanaged vegetation communities such as Tidal Salt Marsh, Tidal Brackish Marsh, Forested and Scrub-Shrub Riparian or, in some areas, Freshwater Marsh, would increase slightly under the No Action Alternative. In addition to the 11-acre restoration/mitigation component, additional acreage of natural habitats would establish or expand primarily on the Giacomini Ranch perimeters due to the lack of active agricultural management. These Natural Landscapes would introduce more visual diversity into the Giacomini Ranch portion of the Project Area, which is currently has low visual diversity due to the large extent of heavily managed pastures present. This visual diversity would result from a shift in the rather monotypic green, flat pastures to the various hues and structural types of Freshwater Marsh, Brackish Marsh, riparian, and other more natural vegetation communities. The discontinuation of agricultural management would allow passive expansion of Freshwater Marsh in portions of the Project Area such as along the perimeter of the West Pasture. In addition, Freshwater Marsh would be expected to continue to expand in Olema Marsh due to steadily increasing water levels and dieback of fringing riparian vegetation.

Over the long-term, the northern 11 acres of the East Pasture, which would be restored to undiked salt marsh habitat, would transition from pasture and Diked Brackish Marsh to Tidal Salt Marsh. During this transitional phase, the wetland restoration/mitigation area would probably become a mix of decaying vegetation with patchy establishment of opportunistic non-native and native brackish marsh species such as annual beard grass (*Polypogon monspeliensis*), brass-buttons (*Cotula coronopifolia*), and fat hen (*Atriplex triangularis*). As with conversion of grasslands, this transitional phase would represent more of a Ruderal Landscape as this small area adjusts to changes in condition and would have many of the same negative impacts on visual resources over the short-term as the transitional phase in unrestored portions of the Giacomini Ranch. The

restored area would not be highly visible from Project Area vantage points, but there could be some negligible adverse impacts on visual resources for people using the West Pasture north levee informal path and the Tomales Bay Trail during the transitional phase.

Riparian growth along Lagunitas Creek, Sir Francis Drake Boulevard and the existing channels in the West Pasture would be expected to expand naturally in the absence or reduction of grazing and other management practices. While riparian habitat is considered by many people to be aesthetically appealing, it also has the potential to obscure vistas or prospects of the Project Area. Any expansion of riparian habitat might conceal or shorten vistas of the Project Area in some areas, specifically the Sir Francis Drake Boulevard view corridor, West Pasture North Levee, White House Pool County Park, and Hunt Lodge East Pasture, but would also add structural and textural diversity to views. Removal of invasive plant species in riparian habitat along Sir Francis Drake Boulevard would temporarily denude the understory beneath the riparian overstory, leading to some short-term adverse impacts in terms of visual intactness to people driving along Sir Francis Drake Boulevard. Due to the dynamic growth characteristic of riparian communities, these impacts would be expected to be indiscernible after two growing seasons.

Over the long-term, some of the retained agricultural infrastructure such as the Giacomini Ranch levees would be expected to slowly degrade. This would not only break up linear features within the landscape, but it would also eventually lead to establishment of Natural Landscape over a larger percentage of the Project Area. Within the higher elevation areas that remain grassland, the sharp, immediate increase in weeds and opportunistic non-native grasses that would be expected to occur with close of the dairy would begin to taper off. Eventually, a more natural grassland community would be expected to establish, although it would continue to be dominated by non-native species. Relative to the expanse of monotypic green pasture present in the East Pasture currently, this grassland would have more visual diversity in terms of spatial variation in color and structural relief.

The No Action Alternative would be expected to have no effect on the natural lightscape of the Project Area and its environs.

Construction: While restoration is limited under the No Action Alternative, construction of the wetland restoration/mitigation component would require use of excavators, bulldozers, trucks, and other heavy equipment. Most of this equipment would be operating primarily in the northwestern corner of the East Pasture, which is only visible to residents of the Point Reyes Mesa and users of the Giacomini Ranch West Pasture informal path and the Tomales Bay Trail. Construction would take place over the dry months of one year. This equipment would disrupt visual resources in the Project Area, although impacts would be very temporary as the construction would only take a couple of months. Due to the very temporary and isolated nature of construction, impacts are characterized as only negligible or barely detectable.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: There is potentially one project that would have cumulative effects should the No Action Alternative be implemented. The Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Coastal Residential (CRAB-2), with a minimum 10,000 square-foot-lot. The potential development site currently contains an unvegetated holding pen, milking barn, and manure piles. Views of the property from the C Street area are already partially obscured by a tall row of Cypress trees separating the Dairy Facility from C Street and by the existing Dairy Barns. In addition, the area is set 9 feet below street level (USGS 2003), which would reduce the extent to which structures built in this area would block the view. Structures in this area do have the potential to obscure some views of the most southern part of the pasture. In addition to shortening the prospect of the Project Area, the development would increase the human footprint of the town and degrade the visual integrity of views of the Project Area. However, relative to existing conditions and the dairy structures present, this project would be expected to have no more than a negligible effect on the overall visual resources.

Conclusions: The No Action Alternative would generally have negligible to minor effects on visual resources within the Project Area (Table 98). Under the No Action Alternative, agricultural management practices would be discontinued, but agricultural infrastructure such as levees, power poles, roads, pipes, and culverts would not be removed. Because of these actions, the No Action Alternative would either convert a highly managed

Pastoral Landscape into largely a Ruderal or lightly managed Pastoral Landscape, depending on whether leased grazing is permitted under this alternative in the future.

Over the short-term, this shift would negatively affect the quality of visual resources through increasing the degree of weediness and eliminating the artificially green pastures in the East Pasture created by irrigation. Over the long-term, Natural Landscapes, characterized by unmanaged vegetation communities such as Tidal Salt Marsh, Tidal Brackish Marsh, Forested and Scrub-Shrub Riparian or, in some areas, Freshwater Marsh, would increase slightly under the No Action Alternative. In addition to the 11-acre restoration/mitigation component, more natural habitats would establish or expand primarily on the Giacomini Ranch perimeters due to the lack of active agricultural management. In other areas, the areal extent of non-native grasses and weeds that establishes with close of the dairy would eventually decline and lead over the long-term to establishment of more natural grasslands, although they would still be expected to be dominated by non-native species as are most grasslands in California. These changes would increase the visual diversity, unity, and vividness of landscapes in the Project Area by introducing more variation in the colors or hues and structural types of vegetation present.

Riparian habitat would also expand in response to the reduction in grazing pressure and discontinuation of agricultural management. This would have conflicting effects on visual resources. It would increase the extent of a habitat that many find to be visually appealing, but it would decrease the prospect or the extent of the Project Area that can be viewed from areas such as Sir Francis Drake Boulevard and White House Pool County park. There is potentially one project that would have cumulative effects should Alternative A be implemented. The Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Coastal Residential (CRAB-2), with a minimum 10,000 square-foot-lot. However, relative to baseline conditions and the existing dairy structures and trees already present, this reasonably foreseeable project in combination with the proposed project would be expected to have no more than a negligible adverse overall effect on visual resources.

Alternative A

Analysis: Alternative A would generally have minor adverse to moderate beneficial effects on visual resources within the Project Area (Table 98). Under Alternative A, agricultural management would be discontinued, and agricultural infrastructure would be removed. Only the East Pasture of the Giacomini Ranch would be restored, with no restoration in either the West Pasture or Olema Marsh. Public access would either be expanded or enhanced, primarily on the southern and eastern perimeters of the East Pasture.

Short-Term/Long-Term: Because of the expanded restoration in the East Pasture of the Giacomini Ranch, Alternative A would convert from a highly managed Pastoral Landscape into eventually more of a Natural Landscape, although the West Pasture and higher elevations of the East Pasture would largely remain Ruderal Landscape. This conversion would eliminate the Pastoral Landscape that exists under baseline conditions, although the quality is relatively low because the unsightly intrusion of manmade elements or agricultural infrastructure such as levees, roads, pipes, power poles, and pumphouses negatively affects the visual intactness and unity of this particular Pastoral Landscape unit. Pastoral Landscapes that perhaps have higher scenic integrity (i.e., less unsightly power poles, pumps, levees) continue to exist within the Seashore and on private lands in the local community and southern portion of the Tomales Bay watershed.

Through breaching the levee in several locations and creating tidal channels, the areal extent of Natural Landscapes within the 350-acre East Pasture would be increased from the minimal amount expected under the No Action Alternative to approximately 218 acres over the long-term. In addition, the removal of agricultural infrastructure such as roads, fences, irrigation ditches, and "hard" structures such as the loafing barn, worker housing, pumphouse, and power lines, would enhance the integrity or intactness and overall unity of these landscapes by eliminating unsightly human-made elements. The removal of southern portion of the East Pasture levee would actually increase the prospect or the ability to view the Project Area from vantages such as the White House Pool County park that are now hidden behind 8- to 12- foot-high levees.

Over the long-term, these restoration activities would increase the unity and diversity of visual resources in the East Pasture. Restoration of the northern portion of the East Pasture would lead to the establishment of landscape features created by flood and tide waters that would be characterized by greater variation in topography and vegetation such as hummocks and mounds and texturally rough, spatially patchy groupings of vegetation of different heights. As discussed under the No Action Alternative, increased tidal influence would be expected to result in a die-off of pasture grasses and herbs followed by a gradual transition to salt-tolerant

species. For the first several seasons after levee removal, the northern portion of the East Pasture would be dominated by decaying pasture grasses and herbs, which would be immediately replaced by spatially patchy occurrences of opportunistic brackish marsh species such as annual beard grass (*Polypogon monspeliensis*), brass-buttons (*Cotula coronopifolia*), and other salt-tolerant native and non-native species. This would create, at least over the short-term, a more Ruderal Landscape that would have a minor adverse effect on visual resources by decreasing visual integrity or intactness, unity, and aesthetic appeal. Over time, species more characteristic of salt marshes such as saltgrass (*Distichlis spicata*), pickleweed (*Salicornia* or *Sarcocornia virginica*), and jaumea (*Jaumea carnosa*), would establish, with those areas closest to the tidal creek channels transitioning more quickly. This change would considerably increase the unity, diversity, and aesthetic appeal, of visual resources.

In higher elevation areas above regular tidal inundation such as the southern 30- 40 acres of the 350-acre East Pasture, the discontinuation of grazing and irrigation practices in the rest of the southern portion of the pasture would convert Wet Pasture vegetation communities in this area to an upland mix of non-native annual grasses and weedy forbs. In the first several years, the nutrient-rich soils would likely lead to a considerable increase in cover and overall height of weedy species, including non-native grasses, poison hemlock (*Conium maculatum*), bull thistle (*Cirsium vulgare),* and milk thistle (*Silybum marianum*). These species would eventually decrease in areal extent as nutrients reached levels more characteristic of lightly grazed areas or natural systems. Some of this weediness would be reduced by excavating and removing approximately 13 acres of heavily manured soils in the southern portion of the East Pasture. For a short period after the initial scraping, vegetation cover in this area would be sparse, but opportunistic salt-tolerant and salt-intolerant species would be expected to rapidly colonize depending upon exposure to at tidal action. As with the lower-elevation portions of the East Pasture, this transitional phase would create, at least over the short-term, a Ruderal Landscape that would have a minor adverse effect on visual resources by decreasing visual integrity or intactness, unity, and aesthetic appeal.

Visual resources in the West Pasture and Olema Marsh would be much as described under the No Action Alternative. The removal of grazing could cause a temporary increase in weedy communities, however, the effect is expected to be reduced in the West Pasture relative to the East Pasture, because this pasture is not as heavily managed with lower grazing pressure and no irrigation or manure spreading. Riparian growth would be expected to expand naturally on Fish Hatchery Creek and some of the other small drainages in the absence of grazing and other management practices. Similar to the No Action Alternative, the northern half of the large freshwater marsh in the West Pasture would continue to transition to a more brackish community. In the southern end of the marsh, vegetation cover in the newly excavated marsh created as part of a separate habitat enhancement project would remain relatively sparse as vegetation would take years to become fully established. Conversely, Freshwater Marsh would continue to expand in Olema Marsh, eliminating riparian habitat on the fringe of the marsh. Over the long-term, the remaining levees in the Giacomini Ranch East and West Pastures would likely degrade over time leading to further conversion of Ruderal into Natural Landscapes.

Riparian growth would be expected to expand naturally in the absence of grazing and other management practices, as well as through plantings on the south levee. This expansion would have conflicting impacts on viewsheds: it would increase the areal extent of a type of natural vegetation that is often perceived by visitors and residents as aesthetically pleasing, but it would decrease prospects or opportunities for views of the restored East Pasture from the White House Pool County park trail and Levee Road residences, as well as views of Lagunitas Creek by users of the southern perimeter trail.

Several facilities are proposed to expand or enhance public access opportunities in the Project Area under Alternative A. The most prominent of the public access components proposed is the bridge spanning Lagunitas Creek for the southern perimeter trail, which would connect the town of Point Reyes Station with White House Pool County park. The path itself would follow the same alignment as the existing informal path and would not be likely to disrupt visual integrity or unity relative to baseline conditions. Height of the bridge would need to exceed 16- to 17- feet NAVD88 to allow conveyance of 10-year flood event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows, including the 1- to 2-feet of freeboard that is typically incorporated. Elevation of adjacent lands in White House Pool County park are approximately 11 feet NAVD88, so the bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade. The bridge would be specifically be designed to minimize to the extent possible its visual impacts, and every effort would be made to ensure that it did not exceed the height of the adjacent tree canopy, which is roughly 30-feet (41 feet NAVD88) in height. Because it would break up the broad sweep of Lagunitas Creek as viewed from points east and west of the bridge, such as White House Pool and Inverness Ridge, it would likely have a

minor to moderate adverse effect on the visual integrity or intactness and unity of visual resources in the immediate vicinity, most of which are relatively natural in appearance.

Alternative A also incorporates the eastern perimeter trail, which would follow the existing railroad grade from Mesa Road to the terminus of the Tomales Bay Trail. Construction of this trail would involve removal of wetlands and riparian vegetation. As discussed earlier, riparian vegetation has some intrinsic aesthetic value, so riparian loss could be considered adverse from a viewshed perspective, particularly as the trail would disrupt the integrity or intactness of the riparian and bluff visual resources. However, the trail would increase the number of vantage points from which the restored area can be viewed and would not be highly visible from the towns of Point Reyes Station and Inverness Park. The only potential viewshed impacts would be to residents on the Point Reyes Mesa and possibly users of the Tomales Bay Trail. Because the trail would be at the base of the Mesa, impacts to properties on the top of the mesa or bluff would be minor to moderate at most, because the trail would not be visible and would be unlikely to affect the unity of visual resources. Impacts to residents from potential noise are discussed under Air Resources – Noise and Soundscapes.

At some point, a proposed extension of the southern perimeter trail connecting White House Pool County Park to Inverness Park may be constructed in one of two locations. One proposed location is directly adjacent to Sir Francis Drake Boulevard. This alignment would potentially involve removal of riparian vegetation along Sir Francis Drake Boulevard because of the narrowness of the existing road berm along certain portions of the alignment. As discussed above, this would remove natural vegetation that is often perceived by visitors and residents as aesthetically pleasing, but it would create prospect or more opportunities for views of the unrestored West Pasture. The alternate route -- a proposed raised trail through the southern West Pasture -- would add a linear feature that might negligibly disrupt the integrity or intactness of the Natural Landscape, although it would be mostly obscured from Sir Francis Drake by the thick riparian vegetation adjacent to the road.

In addition to the trails, three constructed viewing areas would be constructed. Because they are intended to blend into the surrounding environment, these viewing areas or platforms would not be expected to detract from the scenic integrity and unity of landscapes in the Project Area.

Alternative A would be expected to have no effect on the natural lightscape of the Project Area and its environs.

Construction: Excavators, bulldozers, trucks and other heavy equipment would be temporarily visible from all sites, except along Bear Valley Road. Equipment would be visible on the East Pasture grading the levees, excavating new channels, disposing of soils with elevated nutrient content, removing infrastructure, and ripping up roads. These activities would be most visible on the eastern side of the Project Area. Construction would be expected to occur over a period of several months through the duration of one dry season. Impacts on visual quality would be moderate during actual construction activities, but of relatively limited duration.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts under Alternative A are the same as those described under the No Action Alternative.

Conclusions: The effects of Alternative A on visual resources would generally range from minor to moderate adverse impacts and minor beneficial impacts to visual resources in the Project Area. Because of the expanded restoration in the East Pasture of the Giacomini Ranch, Alternative A would convert a considerable portion of the highly managed, low-quality Pastoral Landscape into more of a Natural Landscape, although the West Pasture and higher elevations of the East Pasture would remain largely Ruderal Landscape with decreased unity, diversity, vividness, and aesthetic appeal relative to baseline conditions. Even areas expected to convert to Natural Landscapes would undergo a transitional phase that would probably be characterized as Ruderal Landscapes and of lower aesthetic value than baseline conditions. These changes, combined with construction of new public access facilities, would be expected to have minor adverse impacts on visual resources in the Project Area over the short-term, even with the removal of unsightly agricultural infrastructure. Because it would break up the broad sweep of Lagunitas Creek as viewed from points east and

west of the bridge, such as White House Pool and Inverness Ridge, the proposed non-vehicular bridge would likely have a minor to moderate adverse effect on the visual integrity or intactness and unity of visual resources in the immediate vicinity. The bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade, but would be specifically be designed to minimize to the extent possible its visual impacts, such that that it would not exceed the height of the adjacent tree canopy, which is roughly 30-feet (41 feet NAVD88) in height. Over the long-term, establishment of salt marsh communities in more than two-thirds of the 350-acre West Pasture and gradual conversion of weedy high-elevation grassland communities towards conditions more characteristic of lightly grazed or natural systems would provide moderate benefits to the Project Area by increasing the integrity, unity, and diversity of visual resources. Removal of levees would also increase prospect or opportunities to view the restored East Pasture, however, expansion of riparian habitat with discontinuation of grazing could reduce viewing opportunities in certain areas, including the southern perimeter of the East Pasture and along Sir Francis Drake Boulevard.

There is potentially one project that would have cumulative effects should Alternative A be implemented. The Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Coastal Residential (CRAB-2), with a minimum 10,000 square-foot-lot. However, relative to baseline conditions and the existing dairy structures and trees already present, this reasonably foreseeable project in combination with the proposed project would be expected to have no more than a negligible adverse overall effect on visual resources.

Alternative B

Analysis: Alternative B would generally have very similar minor adverse to moderate beneficial effects on visual resources within the Project Area as Alternative A (Table 98). Under Alternative B, restoration efforts are expanded into the West Pasture, although there is still no restoration of Olema Marsh. From a viewshed perspective, the public access component is almost identical to that of Alternative A.

Short-Term/Long-Term: Because of the expanded restoration efforts in the Giacomini Ranch, Alternative B would convert a highly managed, low-quality Pastoral Landscape into more of a Natural Landscape, although higher elevations of the East and West Pastures would remain largely Ruderal Landscape with decreased visual integrity, unity, vividness, and aesthetic appeal relative to baseline conditions. This conversion would eliminate the Pastoral Landscape that exists under baseline conditions, although the quality of this landscape is relatively low because the unsightly intrusion of manmade elements or agricultural infrastructure such as levees, roads, pipes, power poles, and pumphouses decreases the integrity or intactness of this particular Pastoral Landscape unit. Pastoral landscapes that perhaps have higher scenic integrity (i.e., no or much less unsightly power poles, pumps, levees) would continue to exist within the Seashore and on private lands in the local community and southern portion of the Tomales Bay watershed.

Most of the effects of Alternative B on visual resources would be very similar to those under Alternative A, with simply an increase in the extent of Natural Landscapes. A larger extent of pasture in the East Pasture and the West Pasture would be subject to tidal influence and would convert from pastureland to transitional habitats characterized by opportunistic brackish marsh species and eventually to salt marsh vegetation. Under Alternative B, approximately 255 acres of salt marsh would be expected to establish with complete removal of the East Pasture levees and breaching of the West Pasture levee, along with removal of the Fish Hatchery Creek and East Pasture Old Slough tidegates. This would be an 11 percent increase over the extent of salt marsh that could potentially develop under Alternative A. As with Alternative A, the higher elevation portions of the East and West Pasture would remain Ruderal Landscape or ruderal grassland dominated by non-native grasses and weeds. Despite this, overall, changes would be expected over the long-term to have a moderate beneficial effect on visual resources in the Giacomini Ranch. As discussed under Alternative A, transitional habitats would temporarily dominate the restored area, because the discontinuation of agricultural management practices such as grazing, manure spreading, and irrigation would promote establishment by weedy, opportunistic species. This would decrease visual integrity, unity, vividness, and aesthetic appeal over the short-term and result in minor adverse impacts to visual resources.

While Lagunitas Creek levees would be removed or breached under Alternative B, there would be the potential for construction of a small, low (2- to 3 vertical feet high) levee around lower elevation properties or homes on the east side of Sir Francis Drake Boulevard as a possible mitigation measure for potential flooding during larger flood events, although the extent of levee would be generally minor relative to baseline conditions. While increasing safety, these levees would decrease the prospect or vistas for these landowners, as well as at

least locally detract from the visual integrity or intactness and unity of the restored pasture and Lagunitas Creek landscapes.

The public access component in Alternative B is virtually identical to that described under Alternative A. The most prominent of the public access components proposed is the bridge spanning Lagunitas Creek for the southern perimeter trail, which would connect the town of Point Reyes Station with White House Pool County park. Height of the bridge would need to exceed 16- to 19.2 feet NAVD88 to allow for conveyance of the 10- to 100-year flood flows, including the 1- to 2-feet of freeboard that is typically incorporated. Elevation of adjacent lands in White House Pool County park are approximately 11 feet NAVD88, so the bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade. The bridge would be specifically be designed to minimize to the extent possible its visual impacts, and every effort would be made to ensure that it did not exceed the height of the adjacent tree canopy, which is roughly 30-feet (41 feet NAVD88) in height. Because it would break up the broad sweep of Lagunitas Creek as viewed from points east and west of the bridge, such as White House Pool and Inverness Ridge, it would likely have a minor to moderate adverse effect on the visual integrity or intactness and unity of visual resources in the immediate vicinity, most of which are relatively natural in appearance.

The one notable change that would affect visual resources and the ability to view the restored area would be the conversion of the informal spur path on the West Pasture north levee to an overlook at the entrance because of the deconstruction of the West Pasture north levee under Alternative B. As this, like the other overlooks would be in the form of a blind to minimize disturbance to avian species, it would be expected to have negligible adverse impact on visual resources in the Project Area and opportunities to view the Project Area.

Alternative B would be expected to have no effect on the natural lightscape of the Project Area and its environs.

Construction: The effects of construction would be similar to that of Alternative A, except that heavy equipment would be visible in both the southern and northern portions of the West Pasture. Construction of the restoration component would occur primarily during the summer and fall months over a period of two years: the public access component would be constructed separately either concurrently with restoration or after restoration is completed and would take an additional one to two construction seasons. Because the additional restoration in the West Pasture is rather minimal in terms of earthwork, Alternative B would still be expected to have a moderate adverse impact on visual quality during construction.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts under Alternative B are the same as those described under the No Action Alternative.

Conclusions: Alternative B would generally have very similar minor adverse to moderate beneficial effects on visual resources within the Project Area as Alternative A (Table 98). Under Alternative B, restoration efforts are expanded into the West Pasture, although there is still no restoration of Olema Marsh. From a viewshed perspective, the public access component and its effects on visual resources are almost identical to that of Alternative A. Because of the expanded restoration efforts in the Giacomini Ranch, Alternative B would convert a highly managed Pastoral Landscape into eventually more of a Natural Landscape, although higher elevations of the East and West Pastures would largely remain Ruderal Landscape. Under Alternative B, approximately 255 acres of salt marsh would be expected to establish with complete removal of the East Pasture levees and breaching of the West Pasture levee, along with removal of the Fish Hatchery Creek and East Pasture Old Slough tidegates. This conversion would eliminate the Pastoral Landscape that exists under baseline conditions, although the quality of this Pastoral Landscape is relatively low because the unsightly intrusion of manmade elements or agricultural infrastructure such as levees, roads, pipes, power poles, and pumphouses. As with Alternative A, the higher-elevation portions of the East Pasture would convert into a Ruderal Landscape characterized by non-native grassland that would be lower in visual integrity, vividness, and aesthetic appeal relative to baseline conditions. Riparian vegetation would also continue to expand to some degree along Sir Francis Drake Boulevard, possibly decreasing the ability to view the restored West Pasture. Overall, these changes would have an overall moderate beneficial effect on visual resources over the

long-term, however, conversion of pasture to either Natural Landscape or Ruderal Landscape would involve a transitional phase characterized by a sharp increase in weedy, opportunistic species that would detract from visual resources by decreasing intactness, unity, vividness, and aesthetic appeal, which would be a minor adverse impact over the short-term.

There is potentially one project that would have cumulative effects should Alternative A be implemented. The Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Coastal Residential (CRAB-2), with a minimum 10,000 square-foot-lot. However, relative to baseline conditions and the existing dairy structures and trees already present, this reasonably foreseeable project in combination with the proposed project would be expected to have no more than a negligible adverse overall effect on visual resources.

Alternative C

Analysis: Alternative C would generally have moderate adverse and beneficial effects on visual resources within the Project Area that would be very similar to those of Alternative B, at least for the Giacomini Ranch (Table 98). Alternative C includes restoration of both the East and West Pastures of the Giacomini Ranch, as well as restoration of Olema Marsh. Public access is scaled back slightly through conversion of the eastern perimeter through-trail to two spur trails that would not be aligned through the riparian/wetland habitat adjacent to Tomasini Creek and the Point Reyes Mesa bluff.

Short-Term/Long-Term: Alternative C would have very similar effects on visual resources to Alternative B for the Giacomini Ranch. As with Alternative B, Alternative C would convert a highly managed, low-quality Pastoral Landscape into more of a Natural Landscape. Additional restoration and revegetation efforts under this alternative would decrease the extent of Ruderal Landscape in the East Pasture by scraping off weed-dominated surface soils in 30 higher elevation acres in the southern portion of the pasture and conducting a limited revegetation effort with native grass and shrub species. While these restoration efforts would not result in a native-dominated grassland, they would decrease the extent of weediness expected in higher elevation areas of the East Pasture during the transitional and long-term phases of vegetation community establishment. Higher elevations of the West Pasture would still remain largely Ruderal Landscape with decreased visual integrity, unity, vividness, and aesthetic appeal relative to baseline conditions. As discussed under the other alternatives, this conversion would eliminate the Pastoral Landscape that exists currently, although the quality of this landscape is relatively low because the unsightly intrusion of manmade elements or agricultural infrastructure such as levees, roads, pipes, power poles, and pumphouses decreases the integrity or intactness of this particular Pastoral Landscape unit. Pastoral landscapes that perhaps have higher scenic integrity (i.e., no or much less unsightly power poles, pumps, levees) would continue to exist within the Seashore and on private lands in the local community and southern portion of the Tomales Bay watershed.

Most of the effects of Alternative C on visual resources in Giacomini Ranch would be very similar to those discussed under Alternatives A and B, with simply an increase in the extent of Natural Landscapes. Following restoration, transitional habitats would temporarily dominate the restored area, because the discontinuation of agricultural management practices such as grazing, manure spreading, and irrigation would promote establishment by weedy, opportunistic species. This would decrease visual integrity, unity, vividness, and aesthetic appeal over the short-term. However, over the long-term, complete removal of the Lagunitas Creek levees in both the East and West Pastures would result in establishment of more natural landscape features created by flood and tide waters, which would lead to more unity, vividness, and diversity in visual resources relative to baseline conditions through greater variation in topography and vegetation structure. Rather than the monotypic expanse of relatively flat green pasture currently present at least in the East Pasture, greater interaction between the landscape and tidal and freshwater flooding would create more swales and hummocks, as well as a mosaic of rough, patchy vegetation groupings of various heights with a range of colors such as green, tan, and red. Establishment of more natural vegetation communities such as riparian habitat and Freshwater Marsh would also occur along the Giacomini Ranch perimeter with discontinuation of grazing and other agricultural management. These physical and biological changes, along with the more extended and sinuous nature of the tidal channels created in Alternative C relative to the straightened ditches currently present, would increase integrity and unity of visual resources, as well as the diversity of color, line, and texture. These long-term changes would have a moderate beneficial effect on visual resources in the Giacomini Ranch.

One of the largest differences in visual resources between Alternatives B and C comes from adaptive restoration of Olema Marsh. Under this alternative, some initial restoration actions would be undertaken to improve hydraulic connectivity and decrease surface water levels within the currently impounded marsh. Even these actions could cause some dramatic changes in the marsh's appearance, particularly over the short-term. With water levels expected to drop as much as 1- to 4 feet, extensive die-back of the tall emergent Freshwater Marsh vegetation such as cattails (*Typha* spp.), and bulrush (*Scirpus* or *Schoenoplectus californicus* and *Scirpus* or *Schoenoplectus acutus*) would occur as the marsh adjusts to lowered water levels through drops in topographic elevations and at least temporary changes in water and soil chemistry. During interim conditions, as the marsh begins adjusting to lower water surface levels, there may be some invasion of weedy, opportunistic species in response to disturbance and a pulse in concentrations of soil and water nutrients. While peak die-back would taper off within a few years, a large degree of variability in vegetation communities would be expected for at least 10- 15 years in terms of the degree of die-back, the extent of invasion by non-native species, and the rate of recolonization by marsh species until some kind of equilibrium condition is reached. This extensive vegetation die-back would be highly visible to vehicles on Bear Valley and Levee Roads and would, when combined with the minor adverse impacts expected over the short-term from restoration of the Giacomini Ranch, have moderate adverse effects on visual resources.

Over the long-term, this dramatic response to lowered water levels would be reduced as the marsh comes into equilibrium with changed conditions. Brackish marsh vegetation communities, probably dominated by tall emergent species, would be expected to establish near the mouth of the eastern culvert and along the Bear Valley Creek flowpath on the eastern side of the marsh, which would remain the area most influenced by tides. Freshwater Marsh would reestablish throughout most of the rest of the marsh, with the extent dependent on the degree of drawdown in water surface levels. The extent of tall emergents such as cattails and bulrush may decrease as a result of the decrease in water impoundment in Olema Marsh, leading to establishment of short- and mid-sized emergent marsh species. In addition, the lower water surface levels would reverse the current trend of dieback of fringing riparian habitat in response to steadily increasing water levels, which promoted expansion of freshwater marsh. While the dynamics of the marsh will have changed, restoration actions would ultimately increase the diversity of the plant communities and, therefore, the visual diversity that would result from strong variations in the color and structure of vegetation.

The public access components proposed in Alternative C are similar in both structure and visual impacts to those of Alternatives A and B. The most prominent of the public access components proposed is the bridge spanning Lagunitas Creek for the southern perimeter trail, which would connect the town of Point Reyes Station with White House Pool County park. Height of the bridge would need to exceed 16- to 19.2 feet NAVD88 to allow for conveyance of the 10- to 100-year flood flows, including the 1- to 2-feet of freeboard that is typically incorporated. Elevation of adjacent lands in White House Pool County park are approximately 11 feet NAVD88, so the bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade. The bridge would be specifically be designed to minimize to the extent possible its visual impacts, and every effort would be made to ensure that it did not exceed the height of the adjacent tree canopy, which is roughly 30-feet (41 feet NAVD88) in height. Because it would break up the broad sweep of Lagunitas Creek as viewed from points east and west of the bridge, such as White House Pool and Inverness Ridge, it would likely have a minor to moderate adverse effect on the visual integrity or intactness and unity of visual resources in the immediate vicinity, most of which are relatively natural in appearance.

The most significant change from the two previous action alternatives comes from the conversion of the eastern perimeter through-trail to two spur trails. These spur trails would not cause any wetland or riparian impacts and would therefore preserve the integrity or intactness of the Tomasini Creek riparian/Point Reyes Mesa bluff visual resources. This conversion at least slightly diminishes the degree of impact to visual resources, particularly over the short-term. As with Alternatives A and B, the most prominent effect of the public access component on visual resources would result form construction of a new bridge spanning Lagunitas Creek near the location of the old summer dam. This bridge would likely be raised to a height equal to or exceeding the Green Bridge, but would not rise above the surrounding riparian canopy. Because it would break up the broad sweep of Lagunitas Creek as viewed from points east and west of the bridge, such as White House Pool and Inverness Ridge, it would likely have a minor to moderate adverse effect on visual resources by decreasing the visual integrity or intactness and unity of the predominantly Natural Landscape. As the southern perimeter trail would follow the alignment of the existing informal path, enhancement of this facility would have only negligible effects on visual resources relative to baseline conditions. At some point, the southern perimeter trail may be extended from White House Pool County park to Inverness Park. As discussed under Alternative A, this would have varying degrees of adverse impacts on the intactness and integrity of visual resources in areas in and along Sir Francis Drake Boulevard, although one of the possible

alignments, widening the road berm, would remove riparian vegetation along the road that currently screens what would be the restored West Pasture from vehicles.

Alternative C would be expected to have no effect on the natural lightscape of the Project Area and its environs.

Construction: As in Alternative B, heavy equipment would be visible during construction in the Giacomini Ranch and Olema Marsh. Construction would occur primarily during summer and fall months for a period of at least two years, with implementation of many of the adaptive restoration components for Olema Marsh in subsequent years. The public access component would be constructed either during or subsequent to the Giacomini Ranch restoration depending on funding. These construction activities would have, at most, a temporary moderate adverse impact on visual resources, although impacts in less visible, more remote areas could be Under

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts under Alternative C are the same as those described under the No Action Alternative.

Conclusions: Alternative C would generally have very similar minor adverse to moderate beneficial effects on visual resources within the Giacomini Ranch as Alternative B, although impacts to visual resources from restoration of Olema Marsh would elevate short-term impacts to moderate (Table 98). Under Alternative C, restoration efforts are expanded into the Olema Marsh, as well as the Giacomini Ranch. Within the Giacomini Ranch, most of the highly managed, low-quality Pastoral Landscape would be converted by complete removal of all the Lagunitas Creek levees into eventually more of a Natural Landscape, particularly with restoration and revegetation of the higher-elevation 30 acres in the southern portion of the East Pasture. Higher elevations of the West Pasture would still largely remain Ruderal Landscape. This conversion would eliminate the Pastoral Landscape that exists under baseline conditions, although the quality of this Pastoral Landscape is relatively low, because the unsightly intrusion of manmade elements or agricultural infrastructure such as levees, roads, pipes, power poles, and pumphouses detracts from the intactness or integrity of this particular type of landscape. Overall, these changes would have an overall moderate beneficial effect on visual resources over the long-term, however, conversion of pasture to either Natural Landscape or Ruderal Landscape would involve a transitional phase characterized by a sharp increase in weedy, opportunistic species that would detract from visual resources by decreasing intactness, unity, vividness, and aesthetic appeal. In addition, the inclusion of Olema Marsh in the restoration project would increase temporary impacts to visual resources through the extensive die-back of vegetation expected from improving hydraulic connectivity and decreasing surface water levels within the highly impounded marsh. This would increase short-term impacts from minor to moderate under Alternative C. However, over the long-term, restoration of the marsh would reverse some of the adverse impacts to riparian habitat that have been caused by increasing water levels and the associated increase in Freshwater Marsh. From a viewshed perspective, the public access component and its effects on visual resources are almost identical to that of Alternative B, although the eastern perimeter through-trail would be converted to two spur trails, thereby slightly decreasing impacts on the integrity of visual resources along Tomasini Creek and the Point Reyes Mesa bluff.

Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Coastal Residential (CRAB-2), with a minimum 10,000 square-foot-lot. However, relative to baseline conditions and the existing dairy structures and trees already present, this reasonably foreseeable project in combination with the proposed project would be expected to have no more than a negligible adverse overall effect on visual resources.

Alternative D

Analysis: Alternative D would have almost identical effects on visual resources in the Project Area as Alternative C (Table 98). Under Alternative D, the restoration components for the West Pasture and Olema Marsh would be identical to those of Alternative C, but some of the higher elevation areas in the southern portion of the East Pasture would be lowered to intertidal elevations. Tomasini Creek would also be

completely realigned into one of its historic alignments, and upstream hydraulic connectivity would be improved through replacement of the Mesa Road culvert. Public access would be scaled back considerably relative to Alternative C, with the elimination of the through-trail component for the southern perimeter trail, including the bridge spanning Lagunitas Creek. An ADA-compliant trail and viewing platform would also be constructed at White House Pool County park.

Short-Term/Long-Term: As noted above, the effects of Alternative D on visual resources would be almost identical to those under Alternative C. The excavation of higher-elevation portions of the East Pasture to intertidal elevations could have negligible beneficial effects on visual resources over the long-term, because salt marsh would have fewer weeds than grassland and thereby increase the unity and aesthetic appeal of the Natural Landscape. The complete rerouting of Tomasini Creek could increase the visual diversity by adding a sinuous curve or line to the relatively flat landscape. These changes would provide negligible additional benefits to visual resources.

In addition, the public access component in Alternative D would slightly reduce some of the impacts from construction of public access discussed for Alternatives A-C. The southern perimeter through-trail would be converted into a spur trail with a similar alignment to the current informal path, and there would be no bridge. Public access would be further scaled back by elimination of one of the two spur trails on the eastern perimeter. An ADA-compliant trail and viewing platform would be constructed at White House Pool County park. The viewing platform would only be slightly raised and would be designed to blend as much as possible into the surrounding environs.

Even with these changes, the intensity of impacts on visual resources would be characterized as identical to those under Alternative C, with moderate adverse impacts over the short-term and moderate beneficial effects over the long-term relative to baseline conditions.

Alternative D would be expected to have no effect on the natural lightscape of the Project Area and its environs.

Construction: Construction impacts on visual resources would be very similar to those described under Alternative C.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable.

Cumulative Impacts: Cumulative impacts under Alternative D are the same as those described under the No Action Alternative.

Conclusions: Alternative D would have almost identical effects on visual resources in the Project Area as Alternative C (Table 98). The excavation of higher-elevation portions of the East Pasture to intertidal elevations could have negligible beneficial effects on visual resources over the long-term, because salt marsh would have fewer weeds than grassland and thereby increase the unity and aesthetic appeal of the Natural Landscape. The complete rerouting of Tomasini Creek could increase the visual diversity by adding a sinuous curve or line to the relatively flat landscape. In addition, the considerable scaling back of public access component under Alternative D would slightly reduce some of the impacts from construction of public access discussed for Alternatives A-C. Even with these changes, the intensity of impacts on visual resources would be characterized as identical to those under Alternative C, with moderate adverse impacts over the short-term and moderate beneficial effects over the long-term relative to baseline conditions.

There is potentially one project that would have cumulative effects should Alternative A be implemented. The Giacomini Trust owns parcels along C Street on the eastern side of the dairy facility. These parcels are zoned Commercial-Residential (CRAB-2), with a minimum 10,000 square-foot-lot. However, relative to baseline conditions and the existing dairy structures and trees already present, this reasonably foreseeable project in combination with the proposed project would be expected to have no more than a negligible adverse overall effect on visual resources.

Socioeconomics

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

Park Service regulations for NEPA compliance state that, "social and economic impacts are considered an integral part of the human environment in the (Park Service) and should be analyzed in any NEPA document where they are affected. Socioeconomic impacts include those to minority and low-income communities as specified in the Environmental Justice Executive Order (EO 12898; Feb. 11, 1994)." This executive order - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations - requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

CEQA typically focuses on physical changes caused by a project. Economic or social effects of a project are not treated as significant effects on the environment in and of themselves (Section 15131(a)). However, if a project causes a physical change, economic or social effects may be used to determine the significance of physical changes caused by the project (Section 15131(b)). Under Section 21083(c), CEQA requires an agency to determine that a project may have a significant effect on the environment if it will cause substantial adverse effects on human beings, either directly or indirectly.

Significance criteria developed by the county under CEQA incorporate guidance from the state about addressing any social or economic impacts which can be traced through a chain of cause and effect to physical changes.

General Methodologies and Assumptions

- Marin County has a $500 million annual tourist industry. It is estimated that the Seashore contributes over $150 million to the regional economy visitor expenditures on dining, fuel, gifts, groceries, and lodging (NPS 2002). Including secondary effects, the total economic impact of the park on the local economy is $113 million in sales, $42 million in wages and salaries, and 1,800 jobs (Michigan State University 2001).
- The proposed project would potentially have an effect on the local economy through increases in visitation to the restored wetland and public access facilities.
- In addition to any possible effects on minority and low-income populations and communities, alternatives were evaluated for their potential direct impacts, such as increased visitation and tourist dollars, and indirect economic effects, such as potential increases in property value for properties bordering the Project Area due to the attractiveness of living adjacent to a restored wetland.
- During construction, the proposed project would have the potential to adversely affect socioeconomic conditions in the local community through any detrimental effects that the construction activities have on visitation to the Project Area and other portions of the Seashore, Tomales Bay State Park and other state and local parks, and private commercial businesses on the Point Reyes Peninsula.
- Impact thresholds are based on estimates of 2.5 million visitors generating $150 million in 2000 (NPS 2002; Table 99). This equates to approximately $60 per visitor contributed to the local economy.
    - Estimates of potential increases in visitation associated with implementation of the proposed project are used to evaluate the relative magnitude of potential effects on socioeconomic conditions in the local community.
    - One of the factors qualitatively taken into consideration is the number of ***new*** visitors drawn to the local community by facilities offered by the proposed project versus the number of users that are either residents or incidental users or visitors who come to the Region for other reasons, but who ended up using facilities. The former would be considered new dollars for the local economy.
    - For the construction period, the potential impacts in road delays or detours on visitation to the local community are qualitatively evaluated in terms of temporary effects on socioeconomic conditions.

TABLE 99. SOCIOECONOMIC RESOURCES

Source: CEQ. Park Service regulations, California and County CEQA policies **Nature**: Beneficial, Adverse **Context**: Local Community **Duration**: Construction, Short-Term, Long-Ter*m*

TABLE 99. SOCIOECONOMIC RESOURCES

No Impact	There would be no potential for impact to socioeconomic conditions in the local community associated with the proposed project.
Negligible	The proposed project would generate an undetectable or barely detectable change (≤ 1 percent) in socioeconomic conditions in the local community as based on 2000 estimates of park-generated spending in the local economy.
Minor	The proposed project would generate a small, but measurable change (> 1 percent and ≤ 10 percent) in socioeconomic conditions in the local community as based on 2000 estimates of park-generated spending in the local economy.
Moderate	The proposed project would generate an apparent or appreciable change (> 10 percent and ≤ 25 percent) in socioeconomic conditions in the local community as based on 2000 estimates of park-generated spending in the local economy.
Major or Substantial	The proposed project would generate a major or substantial change (>25 percent) in socioeconomic conditions in the local community as based on 2000 estimates of park-generated spending in the local economy.

Impact Analysis

TABLE 100. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR SOCIOECONOMIC RESOURCES

All impacts would be considered Local Community and Construction and Short-Term/Long-Term.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Construction-Related Effects	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible	Adverse - Negligible
Project-Related Effects	Beneficial - Negligible	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor	Beneficial - Minor

No Action Alternative

Analysis: The No Action Alternative would generally have negligible effects on socioeconomic resources in the local community during construction and after implementation (Table 100). Under the No Action Alternative, levees, tidegates, and culverts in the Giacomini Ranch are not breached or removed, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The remainder of the levee would not be deconstructed, although there would be no levee maintenance. Olema Marsh is also not restored, and there would be no new public access facilities.

As discussed in detail under Public Services – Traffic and Transportation and Visitor and Resident Experience – Public Access Resources, the effects of construction on traffic and the quality of the visitor and resident experience are not large enough to have more than a very negligible impact, if any impact at all, on the local economy. Project construction would be expected to have effects on the local economy if traffic delays were considerable; facilities were closed for a long period of time; and noise and other construction-related factors disrupted the visitor and resident experience sufficiently to keep visitors from returning to the region. This alternative would have no more than a negligible effect on any of these factors. Conversely, construction can generate income through purchases in local communities, although these beneficial would be expected to be very negligible overall.

For this alternative, project-related effects would arise principally from any income generated through increased visitation to the Project Area. This alternative would have only very negligible effects on visitation, so project-related effects on the local economy would be very negligible, as well.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Other currently proposed or reasonably foreseeable projects that could have the potential to cause cumulative impacts should the No Action alternative be implemented would be residential development on private lands along C Street and the Pacific Artisans Housing Development, both of which are in Point Reyes Station. These projects cumulatively have the potential to result in development of perhaps as many as 11 to 14 new homes in the town based on zoning, although the final number of allowable homes would depend on site factors such as results of percolation tests. While it is difficult to predict the intensity of effects of projects that have not been proposed, much less fully designed, these projects would probably have negligible to at most very minor effects on the local economy, considering that the Point Reyes Affordable Home project, which resulted in construction of a much larger number of housing units (36) was characterized as having only "small" effects on economic growth in the local economy (EDAW 2001). Cumulatively, the proposed projects would be expected to have negligible to minor effects on this largely tourism- and ranching-driven local economy.

Conclusions: The No Action alternative would generally result in negligible effects on the socioeconomic resources in the local community during construction and following implementation (Table 100). Construction would cause very negligible adverse impacts to the local economy, although the project would likely not affect the economy during construction. Over the long-term, the very negligible change in visitation following implementation of this alternative would result in at the most very negligible beneficial effects on local socioeconomic resources. Cumulative effects on the local economy from small proposed and reasonably foreseeable small residential development projects would still have only negligible to minor effects on this largely tourism- and ranching-driven economy.

Alternative A

Analysis: Alternative A would generally have negligible to minor effects on socioeconomic resources in the local community during construction and after implementation (Table 100). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

As with the No Action Alternative, the effects of construction on traffic and the quality of the visitor and resident experience under Alternative A would have no more than a negligible effect to have more than a very negligible impact, if any impact at all, on the local economy. Project construction would be expected to have effects on the local economy if traffic delays were considerable; facilities were closed for a long period of time; and noise and other construction-related factors disrupted the visitor and resident experience sufficiently to keep visitors from returning to the region. This alternative would have no more than a negligible to minor effect on any of these factors. Conversely, construction can generate income through purchases in local communities, although these beneficial would be expected to be very negligible overall.

For this alternative, project-related effects would arise principally from any income generated through increased visitation to the Project Area. This alternative would have a major beneficial effect on public access resources available to visitors and residents, however, most of the people that would use these resources are either already local residents or, to a lesser degree, visitors whose use of facilities would be expected to largely incidental to the proposed project, that is, they would come to the Point Reyes region for other reasons (e.g., visit Bear Valley Visitor Center, shop in Point Reyes Station, drive out to the Point Reyes Peninsula), but use some of the proposed facilities while they were out here. These two types of users would not be considered to bring "new" dollars to the local economy. Some visitors would potentially come specifically to view the restored wetland or to do bird-watching, but these users would represent a small proportion of the overall user group. Based on this, the overall expected effect of this alternative would be characterized as minor and beneficial.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative A would generally result in negligible to minor effects on the socioeconomic resources in the local community during construction and following implementation (Table 100). Construction would cause at the most negligible adverse impacts to the local economy, although the project would likely not affect the economy during construction.

Over the long-term, this alternative would potentially have minor beneficial effects on the local economy. While this alternative would increase the number of public access resources within the Project Area and local community dramatically, most of the users of these resources would be local residents and visitors who come to the Point Reyes region for other purposes and end up incidentally using public access facilities. The proportion of visitors drawn specifically to facilities in the Project Area and vicinity would be smaller, and, therefore, the number of "new" dollars for the local economy would be relatively small, as well, resulting in this alternative having at most minor beneficial effects on socioeconomic resources in the local community.

Alternative B

Analysis: Alternative B would generally have identical negligible to minor effects as Alternative A on socioeconomic resources in the local community during construction and after implementation (Table 100). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative B would generally result in identical negligible to minor effects as Alternative A on the socioeconomic resources in the local community during construction and following implementation (Table 100). Construction would cause at the most negligible adverse impacts to the local economy, although the project would likely not affect the economy during construction. Over the long-term, this alternative would potentially have minor beneficial effects on the local economy. While this alternative would increase the number of public access resources within the Project Area and local community dramatically, most of the users of these resources would be local residents and visitors who come to the Point Reyes region for other purposes and end up incidentally using public access facilities. The proportion of visitors drawn specifically to facilities in the Project Area and vicinity would be smaller, and, therefore, the number of "new" dollars for the local economy would be relatively small, as well, resulting in this alternative having at most minor beneficial effects on socioeconomic resources in the local community.

Alternative C

Analysis: Alternative C would generally have identical negligible to minor effects as Alternatives A and B on socioeconomic resources in the local community during construction and after implementation (Table 100). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. In Olema Marsh, an adaptive restoration approach would be undertaken through fill excavation and possible culvert replacement to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this

alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Under Alternative C, effects on traffic during construction would be slightly greater than under Alternatives A and B, because of temporary road closures and detours associated with replacement of culverts on two local arterial roadways, Levee Road and Bear Valley Road, that are important connecting routes to Inverness Park, Inverness, and the rest of the businesses, ranches, and portions of the Seashore and Tomales Bay State Park on the Point Reyes Peninsula. However, these temporary road closures are not expected to have any additional adverse effects on visitation that would impact the local economy more than the other alternatives. Conversely, construction can generate income through purchases in local communities, although these beneficial would be expected to be very negligible overall. In general, this alternative would still be expected to have only negligible, if any impacts, during construction on socioeconomic resources in the local community.

In addition, a slight scaling back of public access facilities under this alternative would be expected to have some effect on visitation, although effects of this alternative on the local economy, should it be implemented, would still be expected to be minor, at most.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative C would generally result in identical negligible to minor effects as Alternatives A and B on the socioeconomic resources in the local community during construction and following implementation (Table 100). Even with temporary road closures and detours on some of the local arterial roadways serving the Point Reyes Peninsula, construction would cause only negligible, if any, adverse impacts to the local economy. Over the long-term, this alternative would potentially have minor beneficial effects on the local economy. While this alternative would increase the number of public access resources within the Project Area and local community dramatically, most of the users of these resources would be local residents and visitors who come to the Point Reyes region for other purposes and end up incidentally using public access facilities. The proportion of visitors drawn specifically to facilities in the Project Area and vicinity would be smaller, and, therefore, the number of "new" dollars for the local economy would be relatively small, as well, resulting in this alternative having at most minor beneficial effects on socioeconomic resources in the local community.

Alternative D

Analysis: Alternative D would generally have identical negligible to minor effects as Alternative C on socioeconomic resources in the local community during construction and after implementation (Table 100). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all of the differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to intertidal elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and further scaling back of new public access facilities through elimination of the bridge across Lagunitas Creek and one of the spur trails on the eastern perimeter. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Scaling back of public access facilities under this alternative would be expected to result in more minor increases in visitation relative to baseline conditions, although effects of this alternative on the local economy, should it be implemented, would still be expected to be very minor, if not negligible.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described under the No Action Alternative.

Conclusions: Alternative D would generally result in identical negligible to minor effects as Alternative C on the socioeconomic resources in the local community during construction and following implementation (Table 101). Even with temporary road closures and detours on some of the local arterial roadways serving the Point Reyes Peninsula, construction would cause only negligible, if any, adverse impacts to the local economy. Over the long-term, this alternative would potentially have minor beneficial effects on the local economy. While this alternative would increase the number of public access resources within the Project Area and local community dramatically, most of the users of these resources would be local residents and visitors who come to the Point Reyes region for other purposes and end up incidentally using public access facilities. The proportion of visitors drawn specifically to facilities in the Project Area and vicinity would be smaller, and, therefore, the number of "new" dollars for the local economy would be relatively small, as well, resulting in this alternative having at most very minor, if not negligible, beneficial effects on socioeconomic resources in the local community.

Park Management and Operations

Laws, Regulations, Policies, and Criteria Guiding Impact Analysis

To fulfill its mission, the Park Service receives funding from both the federal appropriations process and other federal revenue sources. Like most federal agencies, the Park Service relies on Federal appropriations to fund its core activities through base funding, although there is increasing use of alternative revenue sources, such as private monies and grants, to fund specific projects. In addition to base funding, certain parks receive monies from fees generated through park admissions, and parks can also apply for one-time funding through certain appropriation programs that cover cyclic maintenance, construction, etc. The Park Service requests direct Congressional funding and reports on the other federal revenue sources through an annual budget document submitted to Congress entitled "Budget Justifications," or more popularly called, the "Green Book." Because of the limited amount of base funding available to support the 389 park units, the Park Service directs its units to consider the effects of proposed projects on base funding, including any increases in operations and maintenance expenses.

General Methodologies and Assumptions

- The proposed project has the potential to affect park management and operations after implementation through administrative and long-term operations and maintenance or life-cycle costs.
- Potential effects of the proposed project on park operations were analyzed by assessing potential or anticipated administrative, operations, and maintenance costs that would not be covered by private funding under the various alternatives or those such as cyclic repair or rehabilitation, which is covered by a separate federal funding source other than base funding (Table 101). Cost estimates were generated, using estimates of administrative costs, as well as maintenance or repair and costs generated during preparation of Level B Cost Estimates.
- It should be noted that staffing and funding levels associated with actions in the alternatives are difficult to project until final plans are completed. The estimates were intended to facilitate the impact analysis and to allow a general assessment of potential effects. The discussions of impacts focus on projects that would create a need for new operations or that would result in major changes in existing operations.

TABLE 101. PARK MANAGEMENT AND OPERATIONS

Source: Park Service Management Policies **Nature**: Beneficial, Adverse **Context**: Regional (Seashore and North District of the GGNRA) **Duration**: *Construction, Short-Term/Long-Term*	
No Impact	There would be no potential for impact to park management and operations associated with the proposed project.
Negligible	The proposed project would generate an undetectable or barely detectable change (<1 percent) in park management and operations spending as projected by estimates of administrative and operations and maintenance costs.

TABLE 101. PARK MANAGEMENT AND OPERATIONS

Minor	The proposed project would generate a small, but measurable change (≥ 1 percent and < 15 percent) in park management and operations spending as projected by estimates of administrative and operations and maintenance costs.
Moderate	The proposed project would generate an apparent or appreciable change (≥15 percent and ≤ 30 percent) in park management and operations spending as projected by estimates of administrative and operations and maintenance costs.
Major	The proposed project would generate a major or substantial change (>30 percent) in park management and operations spending as projected by estimates administrative and operations and maintenance costs.

Impact Analysis

TABLE 102. INTENSITY, NATURE, TYPE, DURATION, AND CONTEXT OF IMPACTS FOR PARK OPERATIONS AND MANAGEMENT
All impacts would be considered Regional (Seashore and North District of the GGNRA) and are separately analyzed for Construction and Short-Term/Long-Term.

	No Action	Alternative A	Alternative B	Alternative C	Alternative D
Impact Indicator	**Intensity, Nature, Type, Duration, and Context of Impact**				
Construction-Related Effects	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible
Project-Related Effects	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible	Adverse-Negligible

No Action Alternative

Analysis: The No Action Alternative would generally have negligible adverse effects on park operations and management during construction and following implementation, largely related to incidental administrative support and periodic maintenance requirements (Table 102). Under the No Action Alternative, intensive agricultural management practices associated with dairy operation would be discontinued, although, under the No Action Alternative, there would be the potential for leased grazing through a separate environmental review process. All levees, tidegates, and culverts in the Giacomini Ranch would remain, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. While the remainder of the levee would not be deconstructed, there would be no formal levee maintenance program, although there may occasionally be some repair performed on select portions for maintenance of the limited existing public access facilities or other reasons. No new public access facilities would be constructed, and Olema Marsh would not be restored.

This alternative would have the potential to affect park operations and management through construction of the wetland restoration component, management of any future leased grazing activities, staff oversight and management of the property (e.g., administrative staff, law enforcement, etc.), and general operations and maintenance, including management activities needed to reduce impacts to adjacent private landowners from flooding or to maintain and repair the limited number of existing public access facilities. For FY2006, the Seashore has about 75 permanent staff, 10 term employees, and 25-30 temporary staff working on a variety of projects and programs. During the peak summer months, the park staff increases to about 150 staff members. This work force is supplemented by 20,000 hours of Volunteers-in-Parks service, Student Conservation Assistants, and AmeriCorps.

The Seashore has an annual base operating budget of approximately $5,581,000. The Seashore also receives fee revenues and special Park Service funding for specific projects. For example, the park receives about $1.5 – $2.0 million annually for cyclic maintenance of historic structures and other natural resources projects. As part of the San Francisco Bay Network, the Seashore benefits from monitoring information gathered as part of the $800,000 Inventory and Monitoring (I&M) Network. The park receives about $625,000 in fee revenues for maintenance projects and operation of the whale shuttle and campground reservation systems, and approximately $1 million for fire management activities.

The No Action Alternative would have only negligible adverse impacts on park operations and management during construction, because construction and management of the wetland mitigation/restoration component would be funded exclusively out of non-Park Service monies. CalTrans funding paid for not only most of the purchase of the Giacomini Ranch, but planning, oversight, and implementation of the wetland mitigation/restoration component. Federal monies obtained to date include $1.55 million in Congressional appropriations used to purchase the Giacomini Ranch and two competitive grant programs (Conservation Challenge Initiative and Park Service-USGS). In addition, permanent base-funded Seashore staff has assisted with administration of the project, such as contracting, payroll, benefits administration, personnel, and maintenance associated with immediate operations and maintenance needs. On an annual basis, it is estimated that, on average, permanent, base-funded staff contribute less than 25 FTE days each year to the proposed project. This level of support from base-funded staff would be expected to continue during construction.

Once construction is completed, most of the recurring costs associated with this alternative would come from incidental administrative and staff support and periodic maintenance requirements. The Giacomini Ranch currently has no park facilities. Maintenance has not been performed by Park staff, as most of the maintenance with the exception of the 2003 West Pasture levee repair and sediment removal from the 1906 Drainage downstream of the Lucchesi residence has been conducted by the Giacominis as part of their on-going operation of the ranch under a Reservation of Use agreement until spring 2007. With closure of the dairy, Park staff would be required for general oversight of the facility, including administration and law enforcement, and management of future leased grazing activities, should grazing be approved through a separate review process. Because levees would not be formally maintained under this alternative, operations and maintenance expenses would be expected to be relatively minimal and limited to management activities needed to reduce impacts to adjacent private landowners from flooding or to maintain and repair the very limited number of existing public access facilities present in the Project Area. Some levee maintenance may be infrequently performed after large flood events to improve condition of the levee or creek bank in areas adjacent to the existing public access trails. Annual or periodic dredging may be required of the 1906 Drainage and Fish Hatchery Creek to continue to reduce the potential for flooding of adjacent private residences. Maintenance would either be performed in-house by park staff or by contractors through park-administered contracts.

Overall, base-funded support during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent a negligible adverse impact on park operations and management.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: There are no currently proposed or reasonably foreseeable projects that would have the potential to cause cumulative impacts should the No Action alternative be implemented.

Conclusions: The No Action alternative would result generally in negligible adverse effects during construction and following implementation on park operations and management, largely related to incidental administrative support and periodic maintenance requirements (Table 102).

Alternative A

Analysis: Alternative A would generally have negligible adverse effects on park operations and management during construction and following implementation, largely related to incidental administrative and staff support and public access-related operations and maintenance requirements (Table 102). Under Alternative A, only the East Pasture would be restored, with new public access facilities limited to the eastern and southern perimeters of the East Pasture. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. The levees along and tidegate/culvert in the West Pasture and Tomasini Creek would remain. In the East Pasture, restoration would involve breaching of levees in the East Pasture along Lagunitas Creek, and excavation of new tidal channels. The southwestern corner of the creek bank would be regraded to a more stabile profile. Most of the actions under this alternative focus on removal or

restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways.

This alternative would have the potential to affect park operations and management through construction of the wetland restoration and public access components, staff oversight and management of the property (e.g., administrative staff, law enforcement, etc.), and general operations and maintenance, including management activities needed to reduce impacts to adjacent private landowners from flooding or to maintain, operate, and repair constructed or enhanced public access facilities.

Alternative A would have only negligible adverse impacts on park operations and management during construction, because construction and management of the wetland restoration component would be handled by a non-profit organization, the Point Reyes National Seashore Association (PRNSA), and funded exclusively out of non-Park Service monies. The wetland restoration component has received funding from a CalTrans mitigation, SS Cape Mohican oil spill settlement funds and and several private and federal grant sources (Gordon and Betty Moore Foundation, National Fish and Wildlife Foundation, North American Wetlands Conservation Act, National Wetlands Conservation Act). PRNSA is seeking additional funding for management and implementation of the wetland restoration component from other private and federal grant sources. It is anticipated that private and federal grant source monies would entirely pay for any further planning needs (i.e., permitting) and implementation or construction of the wetland restoration component. However, the Park Service may pursue federal funding for the public access component, which would be funded, managed, and constructed separately from wetland restoration. Federal monies used obtained to date include $1.55 million in Congressional appropriations used to purchase the Giacomini Ranch and two competitive grant programs (Conservation Challenge Initiative and Park Service-USGS). In addition, permanent base-funded Seashore staff has assisted with administration of the project, such as contracting, payroll, benefits administration, personnel, and maintenance associated with immediate operations and maintenance needs. On an annual basis, it is estimated that, on average, permanent, base-funded staff contribute less than 15 FTE days each year to the proposed project. This level of support from base-funded staff would be expected to continue during construction.

Once construction is completed, most of the recurring costs associated with this alternative would come from incidental administrative and staff support and periodic maintenance requirements. Park staff would be required for general oversight of the facility, including administration and law enforcement. Because levees would not be formally maintained under this alternative, operations and maintenance expenses would be expected to be relatively minimal and limited to management activities needed to reduce impacts to adjacent private landowners from flooding or to maintain and repair the very limited number of existing public access facilities present in the Project Area. Some levee maintenance may be infrequently performed after large flood events to improve condition of the levee or creek bank in areas adjacent to the existing public access trails. Annual or periodic dredging may be required of the 1906 Drainage and Fish Hatchery Creek to continue to reduce the potential for flooding of adjacent private residences. Maintenance would either be performed in-house by park staff or by contractors through park-administered contracts.

In general, focusing on restoration of natural hydrologic processes through removal of levees, tidegates, and culverts rather than on creation of particular habitat types through intensive construction and post-construction management practices would reduce the need for long-term maintenance within the Giacomini Ranch portion of the Project Area relative to baseline conditions. Most of the maintenance needs would be associated with public access facilities such as the southern and eastern perimeter trails, including maintenance of the trail surfaces; maintenance of the footings for the southern perimeter trail bridge; minor creek bank stabilization utilizing biological creek bank stabilization techniques; cleaning of culverts and maintenance of berm for eastern perimeter trail adjacent to Point Reyes Mesa; and upkeep and maintenance of viewing areas and interpretative exhibits.

Should Lagunitas or Tomasini Creek dramatically change course or direction in the future, public access facilities would be realigned accordingly to ensure that natural hydrologic and ecological processes and functions are not impacted. This type of approach to wetland restoration and management of the public access component creates a more sustainable approach to ecosystem restoration that deemphasizes intensive annual or periodic operations and management requirements and thereby decreases associated demands on existing base funding.

Overall, base-funded support (described under the No Action Alternative) during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described for the No Action Alternative.

Conclusions: Alternative A would result generally in negligible adverse effects during construction and following implementation on park operations and management, largely related to incidental administrative support and periodic maintenance requirements (Table 102). Monies needed for implementation of the wetland restoration component would come entirely from mitigation and private and federal grant sources, although federal funding may be pursued for the public access component, which would be funded and conducted separately. Following construction, base funds would be required for incidental administrative support and periodic maintenance requirements, including flood control maintenance on two creeks adjacent to private residences. However, the focus on restoration of natural hydrologic processes would create a more sustainable project and reduce the need for long-term maintenance needs, with the exception of the public access components. Overall, base-funded support during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Alternative B

Analysis: Alternative B would generally have identical negligible adverse effects on park operations and management during construction and following implementation as Alternative A (Table 102). Under Alternative B, the East and West Pastures would be restored, but not Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although a viewing area would replace the informal existing trail on the West Pasture north levee, which would be removed. The culverted berm portion of the eastern perimeter trail would be replaced with a low boardwalk. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. Some connection would be established between the East Pasture and Tomasini Creek through lowering of levees to allow overflow during flood events, but otherwise Tomasini Creek would remain in its current channel with tidegate/flashboard dam structure still in place. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

From a Park Operations and Management perspective, the primary differences would relate to replacement of the culverted berm portion of the eastern perimeter trail with a low boardwalk and the West Pasture north levee trail with a viewing area. In general, both of these changes would result in a reduction in the need for maintenance, although the low boardwalk would also require regular maintenance to maintain its structural integrity. Relative to Alternative A, the need for frequent culvert cleaning and berm repair of the eastern perimeter trail would be considerably reduced, if not eliminated. Also, removal of the West Pasture levee would also decrease the need for minor repairs of this feature to maintain trail functionality.

Overall, base-funded support (as described under the No Action Alternative) during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described for the No Action Alternative.

Conclusions: Alternative B would result generally in identical negligible adverse effects during construction and following implementation on park operations and management as Alternative A, largely related to incidental administrative support and periodic maintenance requirements (Table 102). Monies needed for implementation of the wetland restoration component would come entirely from mitigation and private and federal grant sources, although federal funding may be pursued for the public access component, which would be funded and conducted separately. Following construction, base funds would be required for incidental administrative support and periodic maintenance requirements, including flood control maintenance on two creeks adjacent to private residences and operations and maintenance of public access facilities. Relative to Alternative A, less maintenance related to public access facilities would be required due to replacement of the culverted berm component on the eastern perimeter trail with a low boardwalk and the West Pasture levee trail with a viewing area. The focus on restoration of natural hydrologic processes would create a more sustainable project and reduce the need for long-term maintenance needs, with the exception of the public access components. Overall, base-funded support during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Alternative C

Analysis: Alternative C would generally have very similar negligible adverse effects on park operations and management during construction and following implementation as Alternative A, largely related to incidental administrative and staff support and public access-related operations and maintenance requirements (Table 102). Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Most of the new public access facilities would continue to be limited to the eastern and southern perimeters of the East Pasture, although access along the eastern perimeter would be scaled back through removal of the through-trail component. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

This alternative would have the potential to affect park operations and management through construction of the wetland restoration and public access components, staff oversight and management of the property (e.g., administrative staff, law enforcement, etc.), and general operations and maintenance, including management activities needed to reduce impacts to adjacent private landowners from flooding or to maintain, operate, and repair constructed or enhanced public access facilities. For FY2006, the Seashore has about 75 permanent staff, 10 term employees, and 25-30 temporary staff working on a variety of projects and programs. During the peak summer months, the park staff increases to about 150 staff members. This work force is supplemented by 20,000 hours of Volunteers-in-Parks service, Student Conservation Assistants, and AmeriCorps.

The Seashore has an annual base operating budget of approximately $5,581,000. The Seashore also receives fee revenues and special Park Service funding for specific projects. For example, the park receives about $1.5 – $2.0 million annually for cyclic maintenance of historic structures and other natural resources projects. As part of the San Francisco Bay Network, the Seashore benefits from monitoring information gathered as part of the $800,000 Inventory and Monitoring (I&M) Network. The park receives about $625,000 in fee revenues for maintenance projects and operation of the whale shuttle and campground reservation systems, and approximately $1 million for fire management activities.

Alternative C would have only negligible adverse impacts on park operations and management during construction, because construction and management of the wetland restoration component would be handled by a non-profit organization, the Point Reyes National Seashore Association (PRNSA), and funded exclusively out of non-Park Service monies. The wetland restoration component has received funding from a CalTrans mitigation, SS Cape Mohican oil spill settlement funds and several private and federal grant sources (Gordon and Betty Moore Foundation, National Fish and Wildlife Foundation, North American Wetlands Conservation Act, National Wetlands Conservation Act). PRNSA is seeking additional funding for management and implementation of the wetland restoration component from other private and federal grant sources. It is anticipated that private and federal grant source monies would entirely pay for any further planning needs

(i.e., permitting) and implementation or construction of the wetland restoration component. However, the Park Service may pursue federal funding for the public access component, which would be funded, managed, and constructed separately from wetland restoration. Federal monies used obtained to date include $1.55 million in Congressional appropriations used to purchase the Giacomini Ranch and two competitive grant programs (Conservation Challenge Initiative and Park Service-USGS). In addition, permanent base-funded Seashore staff has assisted with administration of the project, such as contracting, payroll, benefits administration, personnel, and maintenance associated with immediate operations and maintenance needs. On an annual basis, it is estimated that, on average, permanent, base-funded staff contribute less than 25 FTE days each year to the proposed project. This level of support from base-funded staff would be expected to continue during construction.

Once construction is completed, most of the recurring costs associated with this alternative would come from incidental administrative and staff support and periodic maintenance requirements. Park staff would be required for general oversight of the facility, including administration and law enforcement. Because levees would not be formally maintained under this alternative, operations and maintenance expenses would be expected to be relatively minimal and limited to management activities needed to reduce impacts to adjacent private landowners from flooding or to maintain and repair the very limited number of existing public access facilities present in the Project Area. Some levee maintenance may be infrequently performed after large flood events to improve condition of the levee or creek bank in areas adjacent to the existing public access trails. Annual or periodic dredging may be required of the 1906 Drainage and Fish Hatchery Creek to continue to reduce the potential for flooding of adjacent private residences. Maintenance would either be performed in-house by park staff or by contractors through park-administered contracts.

In general, focusing on restoration of natural hydrologic processes through removal of levees, tidegates, and culverts rather than on creation of particular habitat types through intensive construction and post-construction management practices would reduce the need for long-term maintenance within the Giacomini Ranch portion of the Project Area relative to baseline conditions. Most of the maintenance needs would be associated with public access facilities such as the southern and eastern perimeter trails, including maintenance of the trail surfaces where present; maintenance of the footings for the southern perimeter trail bridge; minor creek bank stabilization utilizing biological creek bank stabilization techniques; and upkeep and maintenance of viewing areas and interpretative exhibits. Maintenance needs for trails would be slightly reduced relative to Alternatives A and B through removal of the "through-trail" component of the eastern perimeter trail. As discussed under Alternative A, should Lagunitas or Tomasini Creek dramatically change course or direction in the future, public access facilities would be realigned accordingly to ensure that natural hydrologic and ecological processes and functions are not adversely affected. While the adaptive restoration of Olema Marsh would not necessarily eliminate the need for maintenance of this highly managed system, it could reduce the need for certain types of maintenance through potential replacement of culverts with bridges and a reduction in the frequency of flooding of Levee and Bear Valley Roads.

This type of approach to wetland restoration and management of the public access component creates a more sustainable approach to ecosystem restoration that deemphasizes intensive annual or periodic operations and management requirements and thereby decreases associated demands on existing base funding. Overall, base-funded support during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described for the No Action Alternative.

Conclusions: Alternative C would result generally in very similar negligible adverse effects during construction and following implementation on park operations and management as Alternative A, largely related to incidental administrative support and periodic maintenance requirements (Table 102). Monies needed for implementation of the wetland restoration component would come entirely from mitigation and private and federal grant sources, although federal funding may be pursued for the public access component, which would be funded and conducted separately. Following construction, base funds would be required for incidental administrative support and periodic maintenance requirements, including flood control maintenance

on two creeks adjacent to private residences and operations and maintenance of public access facilities. Relative to Alternative B, less maintenance related to public access facilities would be required due to the through-trail component of the eastern perimeter trail. The focus on restoration of natural hydrologic processes would create a more sustainable project and reduce the need for long-term maintenance needs, with the exception of the public access components. Overall, base-funded support during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Alternative D

Analysis: Alternative D would generally have very similar negligible adverse effects on park operations and management during construction and following implementation as Alternative C, largely related to incidental administrative and staff support and public access-related operations and maintenance requirements (Table 102). Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all of the differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to intertidal elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and further scaling back of new public access facilities through elimination of the bridge across Lagunitas Creek and one of the spur trails on the eastern perimeter. Tomasini Creek would be realigned into one of its historic alignments just downstream of Mesa Road and would run through the constructed freshwater marsh area just north of the Giacomini Ranch dairy facility. There would be no change in restoration approach in the West Pasture from Alternative C, and the same adaptive management approach would be undertaken in Olema Marsh, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

From a Park Operations and Management perspective, the primary differences would relate to elimination of the bridge in the southern perimeter trail and the Mesa Road spur trail. There would also be no ADA-complaint trail component on Park Service lands, which requires more frequent and intensive maintenance than other trails.

Overall, base-funded support during construction and following implementation would still be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Possible Additional Mitigation Measures: No mitigation measures would be proposed under this alternative.

Effectiveness of Possible Additional Mitigation Measures: Not applicable

Cumulative Impacts: Cumulative impacts would be the same as described for the No Action Alternative.

Conclusions: Alternative D would result generally in very similar negligible adverse effects during construction and following implementation on park operations and management as Alternative C, largely related to incidental administrative support and periodic maintenance requirements (Table 102). Monies needed for implementation of the wetland restoration component would come entirely from mitigation and private and federal grant sources, although federal funding may be pursued for the public access component, which would be funded and conducted separately. Following construction, base funds would be required for incidental administrative support and periodic maintenance requirements, including flood control maintenance on two creeks adjacent to private residences and operations and maintenance of public access facilities. Relative to Alternative C, less maintenance related to public access facilities would be required due to elimination of the bridge and the Mesa Road spur trail. The focus on restoration of natural hydrologic processes would create a more sustainable project and reduce the need for long-term maintenance needs, with the exception of the public access components. Overall, base-funded support during construction and following implementation would be expected to total less than 1 percent or $50,000 annually and, therefore, represent only a negligible adverse impact on park operations and management.

Other Impact Analyses Mandated by DO-12 and CEQA

Relationship between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

No Action Alternative

Under the terms of the purchase agreement with the Giacomini Trust, the 7-year Reservation of Use Agreement that has allowed the Giacomini family to continue to operate the dairy since its purchase by the Park Service in 2000 will expire in March 2007, and the dairy will close. Closure of the dairy will occur under all alternatives, including the No Action Alternative. Under the No Action Alternative, there is no wetland restoration or construction of public access facilities, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The Park Service may potentially allow leased grazing of beef cattle or dairy heifers on other portions of the Giacomini Ranch subject to a separate environmental review process. The intensity of grazing relative to baseline conditions would be expected to be much lower due to the fact that the Park Service would be likely to institute resource setbacks and limits on the duration and timing of grazing.

Because closure of the dairy under terms of an existing agreement will occur under all alternatives, the No Action Alternative would not necessarily represent a loss in long-term agricultural productivity of west Marin County, although the Waldo Giacomini Ranch has been one of the largest dairies in this region. As was discussed under Land Use and Planning – Agricultural Land Use, the Giacomini Ranch was established through diking of a historic salt marsh in 1946. Running of a viable dairy in this location has required substantial investments in terms of maintenance of levees, tidegates, culverts, ditches, and irrigation that would have made continued operation of this dairy in the future economically tenuous, if not infeasible, particularly in view of the current market dynamics in California, in which large Central Valley dairies are threatening the viability of smaller operations such as those in west Marin. While dairy operation has not eliminated wetlands from the Giacomini Ranch, it has reduced functionality of these wetlands by disconnecting them from hydrologic sources such as Lagunitas and Tomasini Creek through levees, tidegates, and culverts and introducing new sources of contamination from intensive grazing, manure spreading, and other agricultural management practices. Viewed from this perspective, the dairy represents a short-term use of the environment that has impacted long-term productivity of natural resources within the Tomales Bay watershed. The No Action Alternative would have only negligible effects on enhancing long-term productivity of natural resources, because the wetland mitigation/restoration component is relatively small, and most of the remainder of the ranch would become either fallow open space grasslands or grazed lands, albeit less intensely grazed lands.

Running of a viable dairy in this location has required substantial investments in terms of maintenance of levees, tidegates, culverts, ditches and irrigation

Alternative A

Alternative A would enhance long-term productivity of natural resources in the Tomales Bay watershed. As was discussed under the No Action Alternative, closure of the dairy will occur under all alternatives in March 2007 under terms of an existing agreement with the Giacomini Trust. Therefore, Alternative A and the other alternatives, including the No Action Alternative, would not necessarily represent a loss in long-term agricultural productivity of west Marin County, although the Waldo Giacomini Ranch has been one of the largest dairies in this region.

The Giacomini Ranch was established through diking of a historic salt marsh in 1946. Running of a viable dairy in this location has required substantial investments in terms of maintenance of levees, tidegates, culverts, ditches, and irrigation that would have made continued operation of this dairy in the future economically tenuous, if not infeasible, particularly in view of the current market dynamics in California, in which large Central Valley dairies are threatening the viability of smaller operations such as those in west Marin. While dairy operation has not eliminated wetlands from the Giacomini Ranch, it has reduced functionality of these wetlands by disconnecting them from hydrologic sources such as Lagunitas and Tomasini Creek through levees, tidegates, and culverts and introducing new sources of contamination from intensive grazing, manure spreading, and other agricultural management practices. Viewed from this perspective, the dairy represents a short-term use of the environment that has impacted long-term productivity of natural resources within the Tomales Bay watershed.

Relative to the No Action Alternative, Alternative A would have much more effect on enhancing long-term productivity of natural resources in the Tomales Bay watershed because of the increase in the scale of restoration proposed. Under Alternative A, the entire 350-acre East Pasture would be restored through selected breaching of the levees. There would be no restoration or construction of new public access facilities in the West Pasture or Olema Marsh. Most of the actions under this alternative focus on removal or restoration of agricultural infrastructure such as filling of ditches, ripping of compacted roads, fence removal, and removal of pumps, pipelines, and concrete spillways, although there is some limited tidal channel creation or regrading of creek banks to more stable topographic profiles.

Alternative B

Alternative B would have very similar effects on enhancement of long-term productivity of natural resources in the Tomales Bay watershed as Alternative A, although the scale of restoration would be expanded to include the approximately 200-acre West Pasture, as well as the 350-acre East Pasture. Restoration would involve complete removal of levees in the East Pasture along Lagunitas Creek and excavation of even more new tidal channels. Breaches would be created in the West Pasture levee. The whole southern East Pasture creek bank would be restored through removal of rip-rap bank stabilization and regraded, where needed, to a more stabile profile. Some connection would be established between the East Pasture and Tomasini Creek through lowering of levees to allow overflow during flood events, but otherwise Tomasini Creek would remain in its current channel with tidegate/flashboard dam structure still in place. As with Alternative A, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Alternative C

Alternative C would have very similar effects on enhancement of long-term productivity of natural resources as Alternative B, although the degree and scale of restoration would be expanded to include the 63-acre Olema Marsh, as well as the 350-acre East Pasture and 200-acre West Pasture of the Giacomini Ranch.

As was discussed under Alternative A, closure of the dairy will occur under all alternatives in March 2007 under terms of an existing agreement with the Giacomini Trust. Therefore, Alternative C and the other alternatives, including the No Action Alternative, would not necessarily represent a loss in long-term agricultural productivity of west Marin County, although the Waldo Giacomini Ranch has been one of the largest dairies in this region. Running of a viable dairy in what was once a tidal marsh system has required substantial investments in terms of maintenance that would have made continued operation of this dairy in the future economically tenuous, if not infeasible. While dairy operation has not eliminated wetlands, it has reduced functionality by disconnecting them from hydrologic sources such as Lagunitas and Tomasini Creek and introducing new sources of contamination from intensive grazing, manure spreading, and other agricultural management practices. Viewed from this perspective, the dairy represents a short-term use of the environment that has impacted long-term productivity of natural resources within the Tomales Bay watershed.

Relative to Alternative B, Alternative C would have much more effect on enhancing long-term productivity of natural resources in the Tomales Bay watershed because of the increase in the scale of restoration proposed. Under Alternative C, the East and West Pastures would be restored, along with Olema Marsh. Restoration would involve complete removal of levees in the East and West Pastures along Lagunitas Creek and excavation of even more new tidal channels. A small tidal channel would be initiated off Lagunitas Creek, as

well as in the interior of the East Pasture. Tomasini Creek would be realigned into one of its historic alignments midway through the East Pasture. In Olema Marsh, an adaptive restoration approach would be undertaken, with initial excavation of a shallow berm and the Bear Valley Creek channel to improve hydraulic connectivity and improve drainage of currently impounded waters. As with the other alternatives, this alternative would involve removal or restoration of agricultural infrastructure and discontinuation of agricultural management practices.

Alternative D

Alternative D would have very similar effects on enhancement of long-term productivity of natural resources in the Tomales Bay watershed as Alternative C. The scale of restoration would be expanded slightly relative to Alternative C. Under Alternative D as with Alternative C, the East and West Pastures would be completely restored, along with Olema Marsh. Almost all of the differences between Alternative D and C relate to excavation of a limited portion of the East Pasture to lower-elevation floodplain and marshplain elevations, complete realignment of Tomasini Creek into one of its historic alignments, replacement of the Tomasini Creek Mesa Road culvert with a bridge or arch culvert, and further scaling back of new public access facilities through elimination of the bridge across Lagunitas Creek from project-level consideration and one of the spur trails on the eastern perimeter. There would be no change in restoration approach in the West Pasture from Alternative C, and the same adaptive management approach would be undertaken in Olema Marsh.

Irreversible or Irretrievable Commitment of Natural or Depletable Resources

No Action Alternative

Under the No Action Alternative, the only construction component would be the wetland mitigation/restoration component. There would be no other restoration or construction or enhancement of public access facilities. This alternative would not cause irreversible changes to the environment relative to baseline conditions, as the wetland mitigation/restoration component could easily be leveed and returned to conditions similar to those currently existing. Such an action would violate the terms of the Park Service's mitigation agreement with CalTrans, however, and require the Park Service to repay funds that it received to purchase the ranch and conduct planning and implementation of the wetland mitigation/restoration component.

The construction of the 11-acre wetland restoration/mitigation component would involve irretrievable use of depletable petroleum resources, although the overall effect on this increasingly scarce resource would be expected to be extremely negligible. The amount of fuel that would be used is not known, but construction would be expected to take 6- to 8 weeks and involve use of three to five pieces of construction equipment, which would be unlikely to be operating simultaneously. Relative to baseline conditions, implementation of the No Action Alternative would not incur any additional irreversible or irretrievable commitment of natural or depletable resources through use of vehicles for travel to and from existing public access facilities and operation of construction equipment for maintenance activities or trucks for hauling livestock to and from the Giacomini Ranch should leased grazing be approved through a future environmental review process.

Alternative A

Alternative A would expand restoration actions to incorporate the entire 350-acre Giacomini Ranch East Pasture through selected breaching of levees and would construct new and enhance existing public access facilities on the southern and eastern perimeters of the East Pasture. This alternative would not cause irreversible changes to the environment relative to baseline conditions, as the wetland restoration component in the East Pasture could easily be leveed and returned to conditions somewhat similar to those currently existing, although there would be changes in the vegetation communities present without agricultural management practices such as irrigation. Unless some restored wetland remained, however, such an action would violate the terms of the Park Service's mitigation agreement with CalTrans and require the Park Service to repay funds that it received to purchase the ranch and conduct planning and implementation of the wetland mitigation/restoration. The Park Service has also received monies from other private and public entities that were awarded on the basis of the Park Service restoring a significant portion of the Giacomini Ranch.

Construction of the wetland restoration and public access components would involve irretrievable use of depletable petroleum resources, although the overall effect on this increasingly scarce resource would be expected to be negligible. The amount of fuel that would be used is not known, but construction would be expected to take five to six months over a period of three years and involve use of three to five pieces of construction equipment, which would be unlikely to be operating simultaneously. Relative to baseline conditions, implementation of the Alternative A would incur no to extremely negligible irreversible or irretrievable commitment of natural or depletable resources. While use of vehicles for travel to and from the new and enhanced existing public access facilities would increase to some degree, use of construction equipment for maintenance would decrease, and truck trips to the Giacomini Ranch associated with twice daily milk pick-ups and hauling of livestock would be eliminated, thereby offsetting any increase in the number of personal vehicles in terms of use of depletable or non-renewable resources.

Alternative B

Alternative B would be very similar to Alternative A in terms of irreversible or irretrievable commitments of natural or depletable resources, although it would expand restoration actions to incorporate the 200-acre Giacomini Ranch West Pasture, as well as the 350-acre Giacomini Ranch East Pasture.

Alternative C

Alternative C would expand restoration and public access actions to incorporate the 63-acre Olema Marsh, as well as the 550-acre Giacomini Ranch. This alternative would not cause irreversible changes to the environment relative to baseline conditions, as the Giacomini Ranch could easily be leveed and returned to conditions somewhat similar to those currently existing, although there would be changes in the vegetation communities present without agricultural management practices such as irrigation. Unless some restored wetland remained, however, such an action would violate the terms of the Park Service's mitigation agreement with CalTrans and require the Park Service to repay funds that it received to purchase the ranch and conduct planning and implementation of the wetland mitigation/restoration. The Park Service has also received monies from other private and public entities that were awarded on the basis of the Park Service restoring a significant portion of the Giacomini Ranch. Proposed changes to Olema Marsh could also be reversed through replacement of larger arch culverts or bridges with smaller culverts or placement of fill that would encourage impoundment of waters.

Construction of the wetland restoration and public access components would involve irretrievable use of depletable petroleum resources, although the overall effect on this increasingly scarce resource would be expected to be negligible. The amount of fuel that would be used is not known, but construction would be expected to take three to six months over a period of three to six years and involve use of three to five pieces of construction equipment, which would be unlikely to be operating simultaneously. Relative to baseline conditions, implementation of the Alternative C would incur no to extremely negligible irreversible or irretrievable commitment of natural or depletable resources. While use of vehicles for travel to and from the new and enhanced existing public access facilities would increase to some degree, use of construction equipment for maintenance would decrease, and truck trips to the Giacomini Ranch associated with twice daily milk pick-ups and hauling of livestock would be eliminated, thereby offsetting any increase in the number of personal vehicles in terms of use of depletable or non-renewable resources.

Alternative D

Alternative D would be very similar to Alternative C in terms of irreversible or irretrievable commitments of natural or depletable resources, although it would expand the scale and degree of restoration actions slightly, at least in the East Pasture and Tomasini Creek, and decrease the scale of public access.

Avoidable and Unavoidable Major or Significant Adverse Impacts

No Action Alternative

There would be no avoidable or unavoidable major or significant adverse impacts from construction or implementation of the No Action Alternative.

Alternative A

There would be no unavoidable significant adverse impacts from construction or implementation of Alternative A. Alternative A would have only two potentially major adverse impact that would be considered substantial and significant under CEQA and major under NEPA – 1) exceedance of maximum noise levels for certain sensitive receptors that are directly adjacent to the Project Area during construction and 2) conflict with LCP and Point Reyes Station Community Plan policies regarding protection of riparian and Point Reyes Mesa Bluff habitat because of removal of 0.88-acre of riparian habitat during construction of the eastern perimeter trail. These impacts would be mitigated to less than significant under CEQA and moderate under NEPA using mitigation measures. In addition, as noted earlier under the impact analyses, the Park Service has concluded that none of these possible outcomes would result in impairment of any natural or cultural resource on Park Service lands.

For noise impacts, mitigation would involve using measures that are considered standard construction Best Management Practices (BMPs) for reducing impacts of construction noise to sensitive receptors, including reducing the number of concurrently operating pieces of equipment and delaying construction start times in sensitive construction zones. Potential impacts to ambient noise conditions were analyzed using a conservative or worse-case-scenario approach of having three to five pieces of construction equipment operating simultaneously, which would be unlikely to occur. Impacts to riparian habitat would be mitigated through active and passive restoration of 3.2 acres of riparian habitat in other Streamside Conservation Areas, including Lagunitas Creek and Fish Hatchery Creek, thereby resulting in a net gain of 2.5 acres. While these mitigation measures are believed to be effective enough to reduce these impacts to riparian habitat to less than significant, if their effectiveness is reduced, these impacts could become unavoidable significant adverse impacts. Noise impacts are very temporary and related only to construction, which lessens their severity relative to short-term or long-term permanent impacts.

Alternative B

There would be no unavoidable significant adverse impacts from construction or implementation of Alternative B. Alternative B would have two potentially major adverse impacts that would be considered substantial and significant under CEQA and major under NEPA – 1) exceedance of maximum noise levels for certain sensitive receptors that are directly adjacent to the Project Area during construction and 2) conflict with LCP and Point Reyes Station Community Plan policies regarding protection of riparian and Point Reyes Mesa Bluff habitat because of removal of 0.88-acre of riparian habitat during construction of the eastern perimeter trail. These impacts would be mitigated to less than significant under CEQA and to minor or moderate under NEPA using mitigation measures. In addition, as noted earlier under the impact analyses, the Park Service has concluded that none of these possible outcomes would result in impairment of any natural or cultural resource on Park Service lands.

For noise impacts, mitigation would involve using measures that are considered standard construction Best Management Practices (BMPs) for reducing impacts of construction noise to sensitive receptors, including reducing the number of concurrently operating pieces of equipment and delaying construction start times in sensitive construction zones. Potential impacts to ambient noise conditions were analyzed using a conservative or worse-case-scenario approach of having three to five pieces of construction equipment operating simultaneously, which would be unlikely to occur. These measures, which would include reducing the number of concurrently operating pieces of equipment in sensitive construction zones and other BMPs, would reduce impacts under NEPA to moderate. Impacts to riparian habitat would be mitigated through active and passive restoration of 4 acres of riparian habitat in other Streamside Conservation Areas, including Lagunitas Creek, Fish Hatchery Creek, and upper Tomasini Creek, thereby resulting in a net gain of 3.2 acres. These measures would be expected to reduce impacts under NEPA to minor. While these mitigation measures

are believed to be effective enough to reduce these impacts to riparian habitat to less than significant, if their effectiveness is reduced, these impacts could become unavoidable significant adverse impacts. Noise impacts are very temporary and related only to construction, which lessens their severity relative to short-term or long-term permanent impacts.

Alternative C

There would no unavoidable significant adverse impacts from construction or over the long-term from implementation of Alternative C. Alternative C would have two potentially major adverse impact that would be considered substantial and significant under CEQA and major under NEPA – 1) exceedance of maximum noise levels for certain sensitive receptors that are directly adjacent to the Project Area for a very short period during construction and 2) potential substantial increases in salinities in upstream portions of Lagunitas Creek that could affect municipal groundwater supply operations associated with inclusion of Olema Marsh in the restoration component. These impacts would be mitigated to less than significant under CEQA and moderate and negligible under NEPA for noise and groundwater supply impacts, respectively. In addition, as noted earlier under the impact analyses, the Park Service has concluded that none of these possible outcomes would result in impairment of any natural or cultural resource on Park Service lands.

For noise impacts, mitigation would involve using measures that are considered standard construction Best Management Practices (BMPs) for reducing impacts of construction noise to sensitive receptors, including reducing the number of concurrently operating pieces of equipment and delaying construction start times in sensitive construction zones. As discussed under Alternative A, potential impacts to ambient noise conditions were analyzed using a conservative or worse-case-scenario approach of having three to five pieces of construction equipment operating simultaneously, which would be unlikely to occur.

To mitigate potential impacts to NMWD operations, major adaptive restoration elements would not be implemented unless: 1) monitoring and further investigation of the relationship between Lagunitas Creek salinities and elevated chlorides in the alluvial aquifer demonstrates that the estimated increase in salinities in Lagunitas Creek with restoration of Olema Marsh would not affect the quality of municipal water supply or 2) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. These major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements such that they would only be implemented if initial stage restoration elements did not achieve the desired degree of hydraulic connectivity between Olema Marsh and Lagunitas Creek.

Through iterative hydrodynamic modeling runs, the Park Service, ACR, and CSLC would work with its hydrologic consultants to identify limited restoration actions that could be implemented without causing major impacts to upstream Lagunitas Creek salinities. This limited restoration actions could include excavation of a "notch" in the berm or removal of the berm without shallow excavation of a flow path or vice versa. Should these actions be undertaken, the Park Service would commit to monitoring of salinities during spring or high tide conditions in Lagunitas Creek at the outlet of Olema Marsh and adjacent to the Coast Guard wells to assess how these actions influence Lagunitas Creek salinities. The Park Service will also continue to collaborate with NMWD on monitoring efforts and support the NMWD pursuit of water supply reliability through development of the Gallagher well or others that may provide a dependable water supply to the West Marin Service Area. These mitigation measures would be expected to reduce impacts under NEPA to at most negligible adverse.

While these mitigation measures are believed to be effective enough to reduce impacts to less than significant, if their effectiveness is reduced, impacts could become unavoidable significant adverse impacts. However, noise impacts are very temporary and related only to construction, which lessens their severity relative to short-term or long-term permanent impacts.

Alternative D

There would no unavoidable significant adverse impacts from construction or over the long-term from implementation of Alternative D. Alternative D would have three potentially major adverse impacts that would be considered substantial and significant under CEQA and major under NEPA – 1) exceedance of maximum noise levels for certain sensitive receptors that are directly adjacent to the Project Area for a very short period during construction; 2) potential substantial increases in salinities in upstream portions of Lagunitas Creek

that could affect municipal groundwater supply operations associated with inclusion of Olema Marsh in the restoration component; and 3) exceedance of BAAQMD air quality criteria for NOx emissions during construction. These impacts would be mitigated to less than significant under CEQA and negligible to moderate under NEPA. In addition, as noted earlier under the impact analyses, the Park Service has concluded that none of these possible outcomes would result in impairment of any natural or cultural resource on Park Service lands.

For noise impacts, mitigation would involve using measures that are considered standard construction Best Management Practices (BMPs) for reducing impacts of construction noise to sensitive receptors, including reducing the number of concurrently operating pieces of equipment and delaying construction start times in sensitive construction zones. These measures would reduce impacts under NEPA to moderate. As discussed under Alternative A, potential impacts to ambient noise conditions were analyzed using a conservative or worse-case-scenario approach of having three to five pieces of construction equipment operating simultaneously, which would be unlikely to occur.

To mitigate the potential impacts of restoration of Olema Marsh to NMWD operations, major adaptive restoration elements would not be implemented unless: 1) monitoring and further investigation of the relationship between Lagunitas Creek salinities and elevated chlorides in the alluvial aquifer demonstrates that the estimated increase in salinities in Lagunitas Creek with restoration of Olema Marsh would not affect the quality of municipal water supply or 2) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. As discussed under Alternative C, these major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements. Some limited restoration may be performed if hydrodynamic modeling suggests that restoration actions would not cause substantial increases in salinities in upstream portions of Lagunitas Creek. Should these actions be undertaken, the Park Service would commit to monitoring of salinities during spring or high tide conditions in Lagunitas Creek at the outlet of Olema Marsh and adjacent to the Coast Guard wells to assess how these actions influence Lagunitas Creek salinities. The Park Service will also continue to collaborate with NMWD on monitoring efforts and support the NMWD pursuit of water supply reliability through development of the Gallagher well or others that may provide a dependable water supply to the West Marin Service Area. These mitigation measures would be expected to reduce impacts under NEPA to at most negligible adverse.

Air quality impacts during construction would be mitigated to moderate under NEPA using mitigation measures that were recommended by BAAQMD to reduce NOx emissions. As with noise impacts, mitigation measures for NOx emissions would include restrictions on the number of simultaneously operating pieces of construction equipment.

While these mitigation measures are believed to be effective enough to reduce these impacts to less than significant, if their effectiveness is reduced, these impacts could become unavoidable significant adverse impacts. In terms of NOx emissions and noise, both of these impacts are very temporary and related only to construction, which lessens their severity relative to short-term or long-term permanent impacts.

Growth-Inducing Impacts

No Action Alternative

The No Action Alternative would not be expected to have growth-inducing impacts. The No Action Alternative would not affect any public services such as power, water, sewer, roads, schools, hospitals, and other facilities and services or would not affect them in such a way that would induce growth in the local community or west Marin region. Under the terms of the purchase agreement with the Giacomini Trust, the 7-year Reservation of Use Agreement that has allowed the Giacomini family to continue to operate the dairy since its purchase by the Park Service in 2000 will expire in March 2007, and the dairy will close. Closure of the dairy will occur under all alternatives, including the No Action Alternative. Discontinuation of intensive dairying operations could increase the attractiveness for future development of parcels that are already zoned for commercial or residential development along C Street in Point Reyes Station or along Sir Francis Drake Boulevard in Point Reyes Station, however, this factor would be common to all alternatives and would not necessarily be related to the proposed project.

Under the No Action Alternative, there is no wetland restoration or construction of public access facilities, except for the 11-acre wetland restoration area in the northeastern corner of the East Pasture. The Park Service is required under its existing agreement with CalTrans to restore wetlands as mitigation for impacts caused by CalTrans to aquatic habitat from a road repair on State Route 1 in Marin County in exchange for the Park Service receiving monies to purchase and restore the Giacomini Ranch. The Park Service may potentially allow leased grazing of beef cattle or dairy heifers on other portions of the Giacomini Ranch subject to a separate environmental review process. The intensity of grazing relative to baseline conditions would be expected to be much lower due to the fact that the Park Service would be likely to institute resource setbacks and limits on the duration and timing of grazing. Because the Giacomini Ranch may continue to be grazed to some degree or, if grazing is not authorized, allowed to become fallow grasslands, the No Action Alternative might result in slightly less desirable conditions adjacent to parcels zoned for commercial and residential development relative to the other alternatives, but these parcels would be likely to be developed regardless due to the high property values and quality of life present in the Point Reyes region, as well as the overall attractiveness and scenic value of the area regardless of restoration.

Alternative A

Alternative A would not be expected to have growth-inducing impacts. The proposed project does not involve construction of homes, and Alternative A would not affect any public services such as power, water, sewer, roads, schools, hospitals, and other facilities and services or would not affect them in such a way that would induce growth in the local community or west Marin region. As was discussed under the No Action Alternative, discontinuation of intensive dairying operations could increase the attractiveness for future development of parcels that are already zoned for commercial or residential development along C Street in Point Reyes Station or along Sir Francis Drake Boulevard in Point Reyes Station, however, this factor would be common to all alternatives and would not necessarily be related to the proposed project. Relative to the No Action Alternative, Alternative A might result in slightly more desirable conditions adjacent to parcels zoned for commercial and residential development, but these parcels would be likely to be developed regardless due to the high property values and quality of life present in the Point Reyes region, as well as the overall attractiveness and scenic value of the area regardless of restoration.

Alternative B

As with Alternative A, Alternative B would not be expected to have growth-inducing impacts. See Alternative A for more detailed description.

Alternative C

As with Alternatives A and B, Alternative C would not be expected to have growth-inducing impacts. See Alternative A for more detailed description.

Alternative D

As with Alternatives A, B, and C, Alternative D would not be expected to have growth-inducing impacts. See Alternative A for more detailed description.

Intentionally Left Blank

Chapter 5

Consultation and Coordination

Introduction

This chapter includes a summary of efforts to involve federal, state, and local agencies, organizations, and the public, including local community members and adjacent landowners, in the planning process for the proposed project, beginning with public scoping in 2002.

Project Planning and Scoping

Identification of Lead and Other Interested Agencies

The Park Service purchased the Waldo Giacomini Ranch in 2000 for the purpose of conducting a wetland restoration project. The Park Service is the lead National Environmental Policy Act (NEPA) agency and principal project manager. The Gulf of the Farallones National Marine Sanctuary, whose jurisdiction includes Tomales Bay, actively participated in the negotiations with the California Department of Transportation (CalTrans) and the California Coastal Commission (CCC) that eventually led to the agreement for CalTrans to transfer mitigation obligations to the Park Service in exchange for providing monies for acquisition and restoration of the Giacomini Ranch. During the very early planning stages, the Park Service identified that any wetland restoration effort would affect lands below Ordinary Low Water in Lagunitas Creek, which are owned by the California State Lands Commission (CSLC) and which would trigger the need to conduct a joint federal/state planning process. The CSLC agreed to participate in the planning process as the lead agency for the concurrent state regulatory process under the California Environmental Quality Act (CEQA). Two of the alternatives include restoration in Olema Marsh, a 63-acre freshwater marsh and riparian area that is jointly owned by the Park Service and the non-profit organization, Audubon Canyon Ranch (ACR). Restoration would also require alteration to Levee Road and possibly Bear Valley Road and the White House Pool County park that is owned by the state of California Wildlife Conservation Board and leased by the County of Marin Parks and Open Space District. The Park Service has been working collaboratively with ACR, the County of Marin Public Works department, and the Open Space district, as well as the Gulf of the Farallones National Marine Sanctuary throughout the environmental planning process.

Public Scoping

On September 23, 2002, a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) and to conduct public scoping was published in the Federal Register (Volume 67, No. 184). This NOI announced the initiation of public scoping for the environmental impact analysis process for a proposed wetlands restoration project at the former Waldo Giacomini Ranch. On September 25, 2002, a copy of the NOI and scoping information was sent to 45 adjacent landowners to the project site and 163 persons and organizations on a public review request list maintained by the Seashore. On October 4, 2002, the NOI was distributed to the Governor's Office of Planning and Research State Clearinghouse for distribution to relevant state agencies (SCH# 2002114002). Following agreement by CSLC to act as the lead CEQA agency, a Notice of Preparation (NOP) for preparation of a joint EIS/Environmental Impact Report (EIS) was prepared by CSLC, the lead CEQA agency, and distributed to the State Clearinghouse, which circulated the NOP between May 29 and June 30, 2003. The public scoping period closed on June 30, 2003.

On October 2, 2002, a press release announcing public scoping was distributed to the *Point Reyes Light*, *Marin Independent Journal*, and *Press Democrat*, as well as 28 other media outlets, including newspapers, radio stations, and television stations. The press release noted that public scoping would occur as an agenda item at the Golden Gate National Recreation Area/Point Reyes National Seashore Advisory Commission meeting on October 19, 2002, at the Dance Palace in Point Reyes Station. The press release was also posted on the Seashore's website. A notice of the public scoping was printed in the *Point Reyes Light* newspaper on October 3, 2002.

The Park Service mailed 1,380 notices announcing the public Advisory Commission meeting on October 1, 2002, listing the Giacomini Wetlands Restoration Project as an agenda item for the October 19, 2002 meeting. The 45-day public scoping period closed November 8, 2002. Due to delays at the State

Clearinghouse in distributing the NOI, the scoping period for state agencies was extended to December 6, 2002.

Public comments were heard at a public information meeting at the Point Reyes Dance Palace at the October 19, 2002 Advisory Commission meeting at the Point Reyes Dance Palace where approximately 30 to 40 members of the public attended. The *Point Reyes Light* published an account of the meeting on October 24, 2002.

The public meeting featured a short overview of the planned restoration process, the environmental planning process, a brief history and summary of the project location, and potential benefits and impacts of restoration. At the end of the presentation, the meeting was opened for public comment, with nine (9) members of the public providing comments. The topics covered by the public comments included issues around public access, land use planning, hydrology, alternatives and project planning.

In addition to the public meeting, approximately 86 individuals or private organizations mailed, faxed, or emailed comments regarding the proposed project. Commenting organizations include the Environmental Action Committee of West Marin, Marin County Bicycle Coalition, Access4bikes, Manzanal Homeowners Association, and Audubon Canyon Ranch. The Seashore and CSLC received comments from seven (7) local, state, or federal agencies. Commenting agencies were the CCC; CalTrans; North Marin Water District (NMWD); Marin County Department of Parks, Open Space, and Cultural Services; Marin County Department of Public Works; and the State of California Department of Food and Agriculture and the County Supervisor for the Fourth District, Steve Kinsey. After scoping closed, a staff report was prepared summarizing comments received during initial scoping. A summary of these comments follows later in this section.

Additional Information Gathering Efforts

Alternative Workshops

Following scoping, the Park Service held a series of internal workshops designed to prioritize restoration objectives based on a number of factors, including mitigation requirements, project Purpose, project Goals, and concerns raised by the public and agencies during scoping. The Park Service project staff began working with its hydrologic consultants, KHE, to develop preliminary restoration concepts. After a series of internal meetings, the Park Service met with regulatory and local and state agencies on February 26, 2004, to present these preliminary concepts.

The Park Service also felt that it was very important to meet with landowners adjacent to the Project Area early in the restoration development process, particularly with regards to flooding concerns. The Park Service contacted landowners along Levee Road and the east side of Sir Francis Drake Boulevard in Inverness Park, which are areas that historically have had the most flooding concerns. Approximately 21 landowners and agency staff attended the workshop on March 30, 2004. Separate meetings were also held with agency representatives (described below) in February 2004 and local technical experts in the field of wetland restoration in September 2004. Following these meetings, the Park Service project staff also met with representatives of stakeholder groups from Marin County and interested agencies that requested meetings, including the Marin County Bicycle Coalition, Sierra Club - Marin chapter, Marin Conservation League, Sacramento office of the U.S. Fish and Wildlife Service Endangered Species section, North Marin Water District, and local technical experts in the field of wetland restoration.

The culmination of these meetings and consultations was a public meeting to present and receive feedback on conceptual alternatives. A public workshop held on June 22, 2004, at the Point Reyes National Seashore (Seashore) Red Barn at 6:00 p.m. The Park Service mailed 263 notices announcing the public workshop for the Giacomini Wetlands Restoration Project on May 12, 2004. The letter noted that the Seashore was holding a workshop to discuss and gather input on preliminary restoration and public access concepts that had been developed for the Giacomini Wetlands Restoration Project. On June 7, 2004, a press release announcing the public workshop was distributed to the Point Reyes Light, Marin Independent Journal, and Press Democrat, as well as 28 other media outlets, including newspapers, radio stations, and television stations. Meeting information was also posted on the Seashore's website. The local radio station, KWMR, broadcast information about the meeting during a noontime Park Wavelengths show on June 14, 2004. A notice of the workshop was printed in the *Point Reyes Light* on June 10, 2004.

More than 110 people attended the meeting. The *Point Reyes Light* published an account of the meeting on June 24, 2004. At the workshop, Park Service project staff and consultants presented the Project background, outlined the planning process to date, summarized initial scoping issues, and explained the preliminary restoration concepts. Information was also provided on habitats that might develop within the Project Area as a result of project implementation. These future restoration scenarios were based on the hydrodynamic modeling and analysis performed by KHE. After the presentation, the superintendent of the Seashore answered questions from the audience. The attendees, then, separated into four (4) breakout groups for more detailed discussion of the restoration concepts.

Following the meeting, the public had a 30-day period ending July 23, 2004, in which to submit comments to the Park Service on the restoration concepts and scope of the proposed DEIS/EIR. During this period, the Park Service received more than 100 letters or petitions, phone calls, and requests for meetings. The Park Service met with three groups of West Marin residents that that specifically requested meetings because of concerns regarding land use issues, development, and character of the community or the potential for using the historic railroad grade for public access.

Approximately 58 individuals and 14 private organizations or agencies mailed, faxed, or emailed comments regarding the Giacomini Project by the July 23, 2004 close of the scoping period. Commenting organizations include the Rails to Trails Committee, Environmental Action Committee of West Marin, Marin County Bicycle Coalition, Audubon Canyon Ranch, Sierra Club, Audubon Society, Marin Conservation League, Tomales Bay Association, Inverness Yacht Club, Point Reyes Village Association, and County of Marin Public Works. The Park Service also received two petitions with a total of approximately 450 signatures.

A Park Service staff report consolidated the scoping comments under five (5) major issue headings - Purpose and Objectives, Planning, Restoration Design and Concerns, Public Access, and Miscellaneous. As with the initial comment, most of the comments received during the public workshop and the subsequent scoping period concerned public access, ranging from letters and petitions advocating no public access at all to letters and petitions urging that the Park Service strongly consider a path along the historic railroad grade near the Point Reyes Mesa, in addition to a path between Point Reyes Station and Inverness Park. Issues are summarized in a separate section below.

Public Access Workshops

In response to the considerable public scrutiny of the public access portion of the Project, the Park Service decided to contract for some further technical evaluation of public access. The first study evaluated potential hydrologic, biological, and cultural resource impacts associated with multiple potential public access alignments and infrastructure locations and was prepared by the hydrologic consultant, Kamman Hydrology & Engineering (San Rafael, California) with technical assistance from its biological consultant subcontractor, LSA Associates (Richmond, California), and the Park Service. The second study specifically focused on technical feasibility, land use impacts, and costs of those public access alignments evaluated under Phase I that had only low or moderate environmental and cultural resource impacts and was prepared by LandPeople Landscape Architects (Benicia, California).

Because this study focused on the potential for impacts to adjacent landowners from some of the public access alignments under study, several meetings were conducted with adjacent residents during preparation of this document to better define potential technical feasibility and land use issues. Meetings were held on March 3, 2005, with residents along Sir Francis Drake Boulevard; March 22, 2005, with residents on Levee Road and separately with residents near 3rd and C Street in Point Reyes Station; and on March 23, 2005, with residents near the historic railroad grade on the Point Reyes Mesa. In addition, a meeting for the general public was held on April 11, 2005, at the Red Barn at the Seashore. At this meeting, the consultants, LandPeople, discussed the potential trail alignments and some of the preliminary findings regarding technical feasibility and land uses. Approximately 40-50 people attended this meeting.
Most of the comments voiced at these meetings echoed those of the public scoping meeting, alternative workshops, and comment letters and emails, focusing on concerns regarding the appropriateness and scale of public access and the inclusion of particular trail alignments. Some adjacent landowners did express concerns regarding the potential impacts to residents of either maintaining an existing trail alignment or constructing a new one from noise, trash, traffic and parking, and potential loitering of undesirable elements. These comments are summarized in the section below.

Value Analysis

In 2005, information from these studies, along with input from public scoping and the workshops in 2004, were used by Park Service and CSLC staff and project partners to refine preliminary restoration alternatives and develop a framework for the public access component in 2005. Following conceptual approval by the Park Service's Development Advisory Board, received in June 2005, the Park Service held a Value Analysis process in August 2005, which enabled the Park Service and CSLC to determine whether it had developed a reasonable range of alternatives that meet the Park Service mission, as well as the Project's Purpose, Goals, and Objectives. Value Analysis attendees included a broad range of technical experts from both within the Seashore and the GGNRA, as well as from other parks and agencies, including CSLC and the Marin County Department of Public Works. Comments during the Value Analysis process were again used to further refine alternatives for presentation to the Park Service's Development Advisory Board for pre-design approval in November 2005.

Agency Involvement and Scoping

Scoping

Agency scoping was conducted throughout the project planning process to ensure that agencies became familiar with the proposed project and thereby ensure that the Seashore and CSLC had ample opportunities to learn of any relevant issues or concerns early in the planning process when information could be easily incorporated into information gathering efforts or the alternative development process. For this reason, the Park Service and CSLC made several efforts to meet with agencies for the purpose of disseminating and gathering information.

Regulatory scoping meetings were conducted on November 6, 2002 and November 8, 2002. Attending these meetings, in addition to Park Service staff and technical consultants, were representatives from:

- Regional Water Quality Control Board
- US Army Corps of Engineers
- National Marine Fisheries Service
- California Department of Transportation
- North Marin Water District
- California Department of Fish and Game
- Marin County Department of Public Works
- Marin County Parks and Open Space
- U.S. Geological Survey- Biological Resources Division
- US Fish and Wildlife Service
- Gulf of the Farallones National Marine Sanctuary
- California Coastal Commission

Additional Information Gathering Efforts

On February 26, 2004, the Park Service and CSLC convened a second regulatory scoping meeting to provide information and feedback on the conceptual alternatives. Representatives from regulatory and public agencies at this meeting, in addition to Park Service staff and technical consultants, included:

- Regional Water Quality Control Board
- Marin County Parks
- North Marin Water District
- Marin Resource Conservation District
- US Army Corps of Engineers
- Marin County Department of Public Works
- California Department of Transportation

In addition, separate meetings were held on April 21, 2004, with the USFWS representatives in Sacramento and on-site with the Regional Water Quality Control Board on May 5, 2004. On February 3, 2006, Park Service staff met again with USFWS representatives, but this time, the meeting was conducted on-site at the Project Area.

Since 2002, the Park Service has also conducted a number of meetings with NMWD representatives to discuss the issue of salinity intrusion into the groundwater system that provides water for the local community and implementation of some collaborative monitoring efforts. Several meetings occurred after the public alternatives workshops in 2004, and at least four meetings took place between September-October 2005 with another one in June 2006. Most of these meetings involved presentation of preliminary hydrologic investigation and hydrodynamic modeling results, followed by discussion of relevant issues and outstanding information needs.

Summary of Public and Agency Comments Prior to Release of DEIS/EIR

Listed below are some of the major issues and concerns raised during public scoping and informal public comment prior to release of DEIS/EIR.

Project Purpose and Goals-Restoration and Public Access. One issue generated the greatest number of comments during both public scoping and the alternatives workshop - public access and its compatibility with restoration. Comments were almost equally split between those that favored making public access a high priority and those that urged the Park Service and CSLC to emphasize hydrologic integrity and habitat values of the wetland restoration project over public access. Specifically, the viewpoints raised were:

- There should be no public access, only restoration: public access is incompatible with restoration and would take funds away from the restoration effort.
- While access can be an opportunity to learn about restoration, restoration should take priority over public access, and access should only be incorporated if opportunities do not conflict with restoration goals.
- Community needs for improved access between towns and increased public safety are equally as important as, or even more important, than restoration. Humans are as much a part of the environment as wildlife, and getting people out of cars and out walking or on bikes will improve the environment.
- There needs to be a balance between community needs and the goals of the restoration project.
- Public access has not been adequately considered or incorporated into the project.

Other Issues. Listed below are other issues raised during scoping:

- *Project Scope-Olema Marsh*. Olema Marsh should be incorporated into the restoration project.
- *Project Design/Restoration-Excavation*. The amount of excavation should be kept to the minimum necessary to effect restoration.
- *Project Design/Public Access-Southern Perimeter*. Need exists for a pedestrian/bike path between Inverness Park and Point Reyes Station to improve traffic safety, expand trail network, and/or provide more direct access between the two towns.
- *Project Design/Public Access-Eastern Perimeter*. Need exists for a pedestrian, equestrian, and/or bike path on the historic railroad grade on the eastern perimeter of the East Pasture to provide a connection between Point Reyes Station and the existing Tomales Bay Trail on GGNRA lands near State Route 1.
- *Project Design/Public Access-Compatibility with Restoration*. Any public access provided should be compatible with restoration and should emphasize less intrusive opportunities for public access such as spur trails and viewing areas and overlooks and hikers rather than horses, dogs, and bikes.
- *Hydrologic Impacts-Flooding*. Alternatives should not increase flooding of roads and homes on the project perimeter.
- *Hydrologic Impacts-Saltwater Intrusion into Groundwater Wells*. Alternatives should not increase saltwater intrusion into the local groundwater wells operated by NMWD for the town of Point Reyes Station.
- *Hydrologic Impacts-Water Quality*. Concern expressed about effect of project on water quality in Tomales Bay through increased sedimentation and release of nutrients from undiked pastures.

- *Biological Resources Impacts-Wildlife and Plants*. Project will need to address how the project will affect existing biological resources in the Project Area, such as the California red-legged frog, tidewater goby, and coho and steelhead salmon, as well as wetland, riparian, and upland ecotone habitats.
- *Land Use Impacts-Adjacent Landowners and Local Community*. Project will need to take into consideration impacts on adjacent landowners and the character of the local community, including potential increases in traffic, noise, and parking problems.
- *Land Use Impacts-Local Agriculture*. The direct and cumulative impacts of the project on agriculture should be evaluated, including the impact of land conversion.
- *Public Health and Safety Impacts-Mosquitoes*. Project will need to address how restoration would affect existing mosquito populations.

Release of Draft EIS/EIR for Public Review and Comment

The federal Notice of Availability for the DEIS/EIR was published in the Federal Register on November 3, 2006. A notification that the DEIS/EIR had been filed with the U.S. Environmental Protection Agency (USEPA, EIS No. 20060502) was published on December 15, 2006. A notice that the DEIS/EIR had been filed with the State Clearinghouse (SCH # 2002114002) was published on December 18, 2006.

The Park Service mailed more than 450 letters announcing the availability of the draft EIS/EIR for the Giacomini Wetlands Restoration Project and the commencement of the approximately 60-day public comment period on December 13, 2006. The letter announced that the Seashore and CSLC were holding a public meeting to discuss the alternatives and potential benefits and impacts of the proposed alternatives on January 25, 2007, at 6:30 p.m. in the Red Barn at the Seashore. It also stated that the close of the public comment period was February 14, 2007.

On December 14, 2006, a press release announcing the public workshop was distributed to the *Point Reyes Light, Marin Independent Journal, and Press Democrat*, as well as 28 other media outlets, including newspapers, radio stations, and television stations. Meeting information was also posted on the Seashore's website. The *Marin Independent Journal* and *Point Reyes Light* published articles about release of the draft EIS/EIR and the public meeting on December 14, 2007. A small notice about the public meeting was also published in a *Point Reyes Light* article on whether bike paths had adverse environmental impacts on January 25, 2007.

At the meeting, Park Service project staff presented the Project background, outlined the planning process to date, summarized initial scoping issues and the proposed alternatives, and then discussed the potential benefit and impacts that might result from implementation. After the presentation, Park Service project staff answered questions from the audience, with Barbara Butler from the Pacific West Region Park Service office acting as the moderator. After questions, the Park Service and CSLC staff opened the floor up to comments from the audience. The audience was informed prior to the public portion of the meeting that questions and comments were being only informally recorded. A synopsis of these questions and comments are provided in Appendix A. The meeting adjourned at approximately 8:45 p.m.

Approximately 100 members of the public attended the January 25, 2007, meeting. The *Point Reyes Light* published an account of the meeting on February 1, 2007.

The approximately 60-day period for comments for this second public scoping closed February 14, 2007. On March 2, 2007, the USEPA published its findings on review of the draft EIS/EIR as Lack of Objection (LO), noting that the "EPA supports the proposed project and believes it will significantly improve the hydrologic and ecological processes and functions in the Tomales Bay Watershed."

Response During the Public Comment Period

Approximately 187 individuals, organizations, and agencies mailed, faxed, or emailed comments regarding the Giacomini Wetland Restoration Project by February 14, 2007. Of the 187 letters, approximately 170 were from private individuals. There were no form letters. More than 99 percent of the letters submitted were from residents of Marin County. There were seven (7) commenting organizations: the California Native Plant Society; Environmental Action Committee of Marin; Marin County Bicycle Coalition/Sierra Club, Marin

Chapter/Community Pathways Committee/Access 4 Bikes; Point Reyes Lodging Association; Point Reyes Village Association; Sierra Club, Marin Chapter; and Tomales Bay Association.

The Seashore and CSLC received 10 comments from local state, or federal agencies – the California Coastal Commission; the California Regional Water Quality Control Board; the Gulf of the Farallones National Marine Sanctuary; the North Marin Water District; the Marin/Sonoma Mosquito and Vector Control District; the County of Marin Department of Public Works; the County of Marin Department of Parks and Open Space District; the State Department of Conservation; the State of California Department of Fish and Game; and the USEPA.

More than 90 percent of the comments received during the public workshop and the subsequent comment period concerned the choice for the Preferred Alternative. A large number of comments also advocated modifications to either the Preferred Alternative identified in the DEIS/EIR (Alternative C) or to Alternative D (the Environmentally Preferred Alternative), with most of these proposed modifications focusing on changes to the public access components on the eastern and southern perimeters of the Project Area.

Review of Comment Emails and Letters

All correspondence was read and scanned into digital format by Seashore staff. To ensure that all comments and/or issues voiced in letters or oral comments received during the comment period were noted and summarized accurately, all of the letters received from individuals, organizations, and agencies were reviewed by two Seashore staff members.

Seashore staff reviewed the letters and identified 346 separate comments, some of which were repeated in multiple letters. Comments and/or issues that shared a common theme were consolidated to the extent possible under Concern Statements or, if the topic of the comments was not similar to others, they were left as individual comments. These comments included both those that would necessitate changes or additions to the DEIS/EIR and those that would be responded to in the document, but that would not necessitate a change in the content or structure of the document. Comments that necessitate changes or additions to the DEIS/EIR included those that 1) questioned, with reasonable basis, the accuracy of information in the DEIS/EIR; 2) questioned, with reasonable basis, the adequacy of the environmental analysis; and 3) presented reasonable alternatives other than those presented in the DEIS/EIR.

A table was then prepared that listed all of the Concern Statements and individual comments under major issue headings (Table 103). The Concern Statements and comments are consolidated under 17 major issue headings – Purpose and Objectives; Process; Impact Analysis-General; Impact Analysis-Hydrologic and Hydraulic Processes and Flooding; Document Content and Structure; Alternatives; Restoration Components; Public Access-General; Public Access-ADA; Public Access-Bridge; Public Access-Dog; Public Access-East; Public Access-South; Construction; Invasives; Miscellaneous; and Permitting (Table 103). Responses were prepared by Park Service staff, with technical assistance from consultants, and reviewed by the Park Service and CSLC planning team and consultants. Park Service and CSLC responded to comments in one or both of two (2) ways. Comments were addressed both through formal responses in the table at the end of this section and, when necessary and appropriate, through minor to major revisions in text, graphics, and tables of the DEIS/EIR to produce the FEIS/EIR.

To allow the public to track the project proponents' response to comments, individual comments within letters are numbered, and this number is correlated with the comment number for the appropriate Concern Statement or individual Comment included in the table at the end of this section. Members of the public can track the response to their comments in several ways. Through the Park Service's Planning, Environment, and Public Comment (PEPC) system, members of the public will be able to see electronic copies of their comments and view a table that lists each commenting person, organization, or agency; the Concern Statement or Comment numbers that pertain to issues or comments raised in those letters; and the corresponding actions and/or responses from the project proponents. In addition, Volume II of the FEIS/EIR incorporate all letters received, as well as tables listing the names of each commenting person, organization, or agency; the number of the Concern Statements or Comments that pertain to issues or comments raised in those letters; and the corresponding actions and/or responses from the project proponents.

Compliance Status

Federal Regulations

Documentation of Park Service compliance with federal and state laws and regulations is incorporated into the text of the EIS. Compliance with relevant federal environmental and cultural resource protection laws, regulations and executive orders, is summarized here.

National Environmental Policy Act (NEPA) of 1970. PL 91-190, 83 Stat. 852, 42 USC §4341 et seq. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences and take actions that protect, restore, and enhance the environment. Regulations implementing NEPA are set forth by the Council on Environmental Quality (CEQ). Additional regulations are provided by the Park Service, including Park Service Director's Order #12, which ensures that the document meets Department of Interior and Park Service standards. The Park Service is the lead NEPA agency and the primary project proponent and manager.

Federal Water Pollution Control Act (Clean Water Act) and subsequent amendments of 1977 (33 USC §1251 et seq.). The Clean Water Act provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 (33 U.S.C. 1344) of the Act prohibits the discharge of fill material into navigable waters, tributaries to navigable waters, and special aquatic sites of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (the Corps) and U.S. Environmental Protection Agency. Under Section 401 (33 U.S.C. 1341), states and tribes can assume responsibility for Section 401 oversight and can review and approve, condition, or deny all Federal permits or licenses that might result in a discharge to state or tribal waters, including wetlands. This project would potentially involve removal or breaching of levees on creeks, realignment of creeks, and excavation and/or permanent or temporary fill in special aquatic sites such as wetlands. It also has the potential to affect water quality within the Project and in downstream water bodies. Because of this, the project will require Section 404 permits from the Corps and Section 401 certification from the San Francisco Regional Water Quality Control Board. Applications for Section 404 permits and Section 401 certifications would be submitted concurrent with production of the final environmental document.

Any construction activity that includes clearing, grading, excavation, stockpiling, or reconstruction of existing facilities involving removal and replacement, resulting in land disturbance of 5 acres or greater, must be conducted in accordance with the **National Pollution Discharge Elimination System General permit** for Discharges of Storm Water Runoff Associated with Construction Activity (referred to as the Construction Activities Storm Water General Permit). The permit prohibits the discharge of materials other than storm water and states that storm water discharges shall not cause pollution. Non-storm water discharges are allowed only if they: 1) do not contribute to a violation of a water quality standard, 2) controlled through implementation of Best Management Practices; and 3) are infeasible to eliminate. The permit requires that construction related activities that cause or contribute to exceedance of a water quality standard must be corrected immediately and a report made to the RWQCB within 14 days. Each permitted construction site must prepare a site specific Stormwater Pollution Prevention Plan (SWPPP) prior to disturbing the site. The SWPPP must include a site description and identify BMPs that address erosion and sediment controls and management of construction waste. The SWPPP must also include post-construction controls and management of non-storm water. Applications for a NPDES will be submitted during production of the final document.

Coastal Zone Management Act of 1972, as amended through PL 104-150, The Coastal Zone Protection Act of 1996 (16 U.S.C. §1451 et seq.). This act protects coastal environments and transfers regulatory authority to the states and excludes federal installations from the definition of "coastal zone." Within California, the California Coastal Commission (CCC) administers the state program (California Coastal Act) for implementation of the federal Coastal Zone Management Act (CZMA). Any action by a federal agency such as the Park Service requires a federal consistency determination by the CCC as required by CZMA. The CCC manages fill, dredge, and other non-point activities affecting wetlands within the Coastal Zone. In California, the Coastal Zone is broken into Local Coastal Program (LCP) units that specifically oversee land use and management of resources within their jurisdiction (see section "State and Local

Legislation, Policies, and Plans"). This project falls within the Coastal Zone and has wetlands and riparian areas that would be subject to oversight under the Coastal Act and the LCP. The Park Service would make a determination regarding consistency and submit to the CCC for concurrence subsequent to production of the final environmental document.

Endangered Species Act of 1973, as amended, PL 93-205, 87 Stat. 884, 16 USC §1531 et seq. The Endangered Species Act protects threatened and endangered species from unauthorized "take", and directs federal agencies to ensure that their actions do not jeopardize the continued existence of listed species. Section 7 of the act defines federal agency responsibilities for consultation with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) for fish and marine mammal species. Consultation requires preparation of a Biological Assessment to identify threatened or endangered species that are likely to be affected by the proposed action. Presence of these species or their habitat affects projects on several levels, specifically proponents:

- Must avoid harming listed species either through "take" or through harassment, unless incidental take authorized by USFWS;
- Must avoid impacts to habitat deemed as "Critical" to species or must mitigate for impacts to habitat; and
- Must avoid undertaking construction and/or maintain a construction buffer during critical seasons such as breeding and nesting when listed species are present.

Several federally threatened or endangered species, as well as Critical Habitat, have been documented in the Project Area. The Park Service and CSLC will be initiating formal consultation with the USFWS and NMFS concurrent with preparation of the final environmental document.

Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §703-712). The Migratory Bird Treaty Act decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The MBTA protects all common wild birds found in the United States, except the house sparrow (*Passer domesticus*), European starling (*Sternus vulgaris*), feral pigeon (*Columbia livia*) and resident game birds such as pheasant, grouse, quail, and wild turkeys (*Meleagris gallopavo*). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 Code of Federal Regulations (C.F.R.) Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). "Taking" is considered disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young). Both special status and common bird species breed and nest in or on the perimeter of the Project Area. Construction would need to be phased to avoid breeding and nesting season, and/or pre-construction bird surveys would need to be conducted.

Magnuson-Stevens Fishery and Conservation Management Act, as amended (PL 94-265, 16 U.S.C. §1801). The Magnuson-Stevens Fishery Conservation and Management Act is the governing authority for all fishery management activities that occur in federal waters within the United States 200 nautical mile limit, or Exclusive Economic Zone (EEZ). One of the potentially applicable components of this act is that it requires conservation and enhancement of Essential Fish Habitat (EFH). Defined by Congress as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity," the designation and conservation of Essential Fish Habitat seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities such as dredging and filling. Species that are regulated under EFH include Chinook and coho salmon, both of which have been sighted in Lagunitas Creek, which runs through the center of the Project Area (Figure 2). EFH consultation would be conducted with NMFS during Section 7 consultation, which would concurrent with preparation of the final environmental document.

National Marine Sanctuary Act, as amended (Public Law 92-532, 16 U.S.C. 1431-1445). The boundary for the Gulf of the Farallones National Marine Sanctuary (GFNMS) extends into the southern portion of Tomales Bay and is defined as those areas below the mean high tide line of Tomales Bay. The Sanctuary prohibits or otherwise regulates activities related to discharging or depositing any material or matter, constructing structures, drilling through the seabed, dredging or altering the seabed, or removing or damaging any historical or cultural resource (15 CFR, Chapter IX, Subpart H). Once tidal action is restored, future adaptive restoration or management actions must take into consideration GFNMS regulations, and the appropriate consultations must be made with GFNMS.

Clean Air Act, as amended (PL 101-549) and General Conformity Rule (40 CFR parts 51 and 93). The Clean Air Act (CAA) charges the Environmental Protection Agency (EPA) with identifying national ambient air quality standards to protect public health and welfare. The federal government has ceded responsibility and authority to establish more stringent air quality standards and regulations to states, which are required to develop state implementation plans (SIP) to achieve and maintain federal air quality standards. The Bay Area Air Quality Management District (BAAQMD) is the air quality management district for the Project Area and has primary responsibility for control of air pollution. BAAQMD has prepared SIPs to address nonattainment and maintenance issues related to the national ozone standards and the national carbon monoxide standard and is in the process of revising the ozone SIP in collaboration with the Association of Bay Area Governments and MTC. The USEPA has developed criteria and procedures for determining the conformity of federal actions to the applicable SIPs. The General Conformity rule (40 CFR parts 51 and 93) applies to nonattainment areas and maintenance areas covered by an approved attainment or maintenance plan. Under this conformity rule, conformance with an applicable SIP is demonstrated by showing that expected emissions are consistent with the emissions budget for the area or air quality basin. Federal actions cannot cause or contribute to new violations, increase the frequency or severity of any existing violation, interfere with timely attainment or maintenance of a standard, delay emission reduction milestones, or contradict the State Implementation Plan. The Park Service is consulting with BAAQMD to ensure that the proposed project conforms with the appropriate SIPs.

Federal Access Legislation. Both the Architectural Barriers Act of 1968 (PL 90-480) and the Americans with Disabilities Act (ADA) of 1990 (PL 101-336) help to ensure that buildings and other facilities meet set standards to make them accessible to all visitors, including those with disabilities. The Park Service complies with ADA standards and, in order to provide the maximum opportunity for visitors to experience national parks, follows the stricter of either the Americans with Disabilities Act Accessibility Guidelines (ADAAG; 36 CFR part 1191) developed in 1991 or the Uniform Federal Accessibility Standards (UFAS) established in 1984. Based on these guidances, the Park Service requires that walks or paths that connect to accessible features and that key features in the park need to be made accessible while being kept consistent with preserving the natural and cultural resources of the park. Public access is proposed as part of this project and is subject to these standards. This project could involve construction of trails on state and county lands and so require compliance with the more stringent handicap access standards of the California Building Code, Title 24 regulations, although the Title 24 standards are intended for urban facilities and not necessarily rural and park-type trails.

State and Local Legislation, Policies, and Plans

Federal projects are not subject to state and local legislation, unless state and local authorities have assumed authority for a federal law (i.e., Section 401 of the Clean Water Act, the Coastal Zone Management Act). However, as this is a joint federal and state project, it must comply with all applicable state and local legislation on state- and county-owned lands. The following authorities apply on lands owned and managed by the California State Land Commission, the County of Marin, and the Audubon Canyon Ranch

California Environmental Quality Act (Public Resources Code §21000 et seq.). The California Environmental Quality Act (CEQA) is the State equivalent of NEPA that applies to projects undertaken or requiring approval from state and local governments. While many aspects of CEQA are similar to NEPA, there are some differences, including in terminology, structure of the environment document required, noticing, evaluation and analysis of alternatives, and requirements regarding mitigation for significant environmental effects. In addition, CEQA provides that all species of concern (e.g., any species considered at-risk by the California Native Plant Society) be considered as protected, regardless of appearance on a formal federal or state Endangered Species Act ESA lists (Guidelines, Section 15380 (b)(d)). The lead CEQA agency for this project is the CSLC.

Porter-Cologne Act (California Water Code, Division 7, §13000). The Porter-Cologne Act is the principal law governing water quality control in California. It establishes a comprehensive program to protect water quality and the beneficial uses of waters of the State. The Porter-Cologne Act applies broadly to all State waters, including surface waters, wetlands, and ground water; it covers waste discharges to land as well as to surface and groundwater, and applies to both point and non-point sources of pollution. The Regional Water Quality Control Boards (RWCCB), which also administers Section 401 of the federal Clean Water Act, govern the nine hydrologic regions into which California is divided, adopting regional water quality control plans (basin plans) for their respective regions. Water quality control plans designate beneficial uses of water, establish water quality objectives to protect those uses, and provide a program to

implement the objectives. This project has the potential to affect surface waters and could therefore require certification from the San Francisco RWQCB under Section 401 for all waters owned by federal agencies and under Section 401 and Porter-Cologne Act for all state, county, and private waters. In addition, the San Francisco RWQCB has established beneficial uses and associated water quality criteria for Tomales Bay and Lagunitas Creek, which runs through the Project Area.

Lake and Streambed Alteration Agreement (Fish and Game Code, §1600 et seq.). The California Department of Fish and Game (CDFG) is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. Any person, state or local governmental agency, or public utility to notify CDFG before beginning an activity that will substantially modify a river, stream, or lake. CDFG has historically had a more limited jurisdiction than the Corps, focusing specifically on lakes, major tidal sloughs, rivers, and streams, where streams are defined as "....a body of water that flows at least periodically or intermittently through a bed or channel having banks...." CDFG also typically includes riparian areas adjacent to rivers and streams within its jurisdiction. If CDFG determines that the activity could substantially adversely affect an existing fish and wildlife resource, a Lake or Streambed Alteration Agreement is required. Because this project may affect creeks and riparian areas adjacent to creeks, a Streambed Alteration Agreement could be required for creeks on state, county, and private lands. If so, an application would be filed subsequent to production of the final environmental document.

California Endangered Species Act (Fish and Game Code, § 2050 et seq.). Similar to the federal government and the Endangered Species Act, the state of California has designated certain wildlife and plant species as endangered, threatened, or rare. Regulation of activities affecting these species is handled by the California Department of Fish and Game (CDFG). Sections of the Fish and Game Code prohibits "take" of any species that the commission determines to be an endangered species or a threatened species; the take, possession, or destruction of birds, their nests or eggs; and/or disturbance that causes nest abandonment and/or loss of reproductive effort. Both federally and state-listed endangered and threatened species occur in the Project Area and vicinity. During production of the final environmental document, project proponents will initiate a consultation with CDFG and, if necessary, seek a permit. Construction would also be phased to avoid breeding and nesting season, and/or pre-construction surveys would be conducted.

Marin County Local Coastal Program, Unit II (LCP). In 1976, the California Legislature enacted the Coastal Act, which created a mandate for coastal counties to manage the conservation and development of coastal resources through a comprehensive planning and regulatory program called the Local Coastal Program (LCP). The LCP is a planning document that identifies the location, type, densities, and other ground rules for future development in the coastal zone. Each LCP includes a land use plan and its implementing measures. These programs govern decisions that determine the short and long term conservation and use of coastal resources. LCPs are updated regularly: The Marin County Community Development Agency was planning to update the LCP as part of the updated CWP process, but has postponed the LCP update. There are at least two areas in which LCP policies supersede those of Marin County ordinances in the Coastal Zone:

- *Grading*. The County's Excavating, Grading, and Filling Ordinance states that any grading in the coastal zone may be subject to a coastal development permit (23.09.012). Grading and clearing which results in movement of more than 150 cubic yards of soil must minimize the amount of exposed soil and be avoided in the winter. Depending on the alternative selected, this project would involve small to substantial amounts of grading.

- *Stream Buffer Areas*. Buffers in the coastal zone are defined to include all riparian vegetation on both sides of the stream or 100 feet from the stream bank. No development or vegetation removal is permitted within this buffer unless no alternative sites are feasible. Mitigation measures to control erosion and runoff and revegetation of disturbed areas are to be included. The project could involve work in stream buffer areas.

The Park Service has determined that the project is within the Local Coastal Planning area, Unit II, and that it would require federal consistency review by the California Coastal Commission (See Coastal Zone Management Act under Federal Environmental Legislation).

County of Marin Ordinances and Codes. The County regulates activities by state and local agencies through ordinances, codes, and other measures. Some of the potentially applicable ordinances or measures are Zoning (Marin County Code Title 22), Grading and Excavating (19.06 and 23.08), Bank Stabilization, and Urban Runoff and Pollution Prevention (23.18.084).

List of Preparers

Between April 2001 and July 2006, an interdisciplinary team of Seashore and GGNRA, and CSLC biologists, administrators, and specialists met 10 times and supervised the planning process and preparation of the DEIS/EIR. In addition, personnel from Park Service Pacific West Regional office were instrumental in providing guidance.

Primary author of the DEIS/EIR was:

Lorraine Parsons, Project Manager, Giacomini Wetland Restoration Project; Wetland Ecologist, Point Reyes National Seashore, MS San Diego State University, BA University of Southern California, BS University of Southern California.

Primary contributing author was:

Brannon Ketcham, Hydrologist, Point Reyes National Seashore; MEM, Water Resources Management, Duke University; BA, Geology, Pomona College.

Other contributing authors were:

Marie Denn, PWR Aquatic Ecologist; MS Environmental Science and Management, University of California Santa Barbara; BS, Zoology, University of California Davis

Amelia Ryan, Bioscience Technician, Wetlands; Seashore; BS, Plant Biology, University of California, Davis.

Geographic Information Systems (GIS) analysis and graphics were prepared by:

Donald Brown, GIS Technician; Seashore; BA, Computer Information Systems, University of Iowa.

Amelia Ryan, Bioscience Technician, Wetlands; Seashore.

Copy editing and formatting of this document was conducted by:

Juanita Barboa, Technical Editor, The Final Word, Colorado. BS, Technical Communication, New Mexico Institute of Mining and Technology.

Park Service and CSLC representatives and other people who assisted in preparing or reviewing this document were:

Heidi West, Environmental Planner, TQNEPA, Colorado. PhD, Environmental Science and Engineering, University of California, Los Angeles; MS, Ecology, California State University Los Angeles; MA, Science Communications, University of California, Santa Cruz; BA, Biology, University of California, Los Angeles.

Eric Gillies, Staff Environmental Scientist, CSLC; MS Environmental Studies, San Jose State University, BA Environmental Studies, California State University, Hayward.

John Kelly, Research Director, Audubon Canyon Ranch. Cypress Grove Preserve. PhD, Ecology, University of California, Davis; MS, Wildlife, Humboldt State University.

Greg Kamman, Certified Hydrogeologist, Professional Geologist, Kamman Hydrology & Engineering, Inc.; MS Geology - Sedimentology and Hydrogeology, Miami University, Oxford, Ohio, AB Geology, Miami University.

Rachel Kamman, Hydrologist, Registered Civil Engineer**,** Kamman Hydrology & Engineering, Inc. M. Eng., Civil (Coastal and Hydraulic) Engineering University of California, Berkeley; BA, Civil Engineering (Hydraulics and Water Resources) Lafayette College, Easton, PA.

***Ed Ueber*, former Refuge Manager, Gulf of the Farallones National Marine Sanctuary. MS, Resource Economics/Fisheries, University of Rhode Island; Post Graduate Certificate, U.S. Maritime History, Munson Institute of Maritime; BA, History, University of Connecticut.

John Dell'Osso, Chief of Interpretation, PRNS; BS, Environmental Planning and Management, University of California, Davis.

Jules Evens, Wildlife Biologist, Avocet Research Associates, MA, Writing, University of San Francisco; BA, Biology, Sonoma State University.

Gary Fellers, Research Biologist, Western Ecological Research Center, US Geological Survey; PhD, University of Maryland; MS, University of Maryland; BA, University of California, Berkeley.

Tom Filler, Staff Environmental Scientist, CSLC: BS, Environmental Policy Analysis and Planning, University of California, Davis.

Darren Fong, Aquatic Ecologist, GGNRA; BS, Environmental Science, University of California, Berkeley, MS, Wildland Resource Science, University of California, Berkeley.

Natalie Gates, Wildlife Biologist, PRNS; MS, Environmental Science and Policy, University of California; DVM, New York State College of Veterinary Medicine (Cornell); BA, Biology, Harvard University.

Richard Grassetti, Principal, GECo Consulting; MA Geography, University of Oregon, BA, Physical Geography, University of California, Berkeley.

Steve Griswold, Trail Planner, Golden Gate National Recreation Area.

Daphne Hatch, Chief of Natural Resource Management and Science, GGNRA; MS Range Management, University of California, Berkeley, CA.

Shawn Maloney, Trails Division, Point Reyes National Seashore.

Bill Merkle, Wildlife Ecologist, GGNRA; PhD, Department of Environmental, Population, and Organismic Biology, University of Colorado, Boulder; BA, Stanford University.

Doug Nadeau, Former Chief of Natural Resources. Golden Gate National Recreation Area. Licensed Landscape Architect; BA, Landscape Architecture; University of California at Berkeley.

Don Neubacher, Superintendent, PRNS; MS Resource Management, Humboldt State University; BS, Environmental Planning, University of California, Davis.

Tom Packard, ASLA, Principal, Tom Packard & Associates: BA Landscape Architecture, University of Illinois at Urbana-Champaign.

Jane Rodgers, Plant Ecologist, PRNS; BS, Forestry, University of California, Berkeley.

Mark Rudo, PWR Cultural Resources Specialist, Archaeology; MA Anthropology -Archeology, San Francisco State University, BA Anthropology, San Francisco State University.

William Shook, PRNS; BS, Secondary Education, Pennsylvania State University.

Kristen Ward, Wetland Ecologist, Crissy Field Marsh, Golden Gate National Recreation Area. M.S. San Diego State University. Wetland Ecology.

Gordon White, Chief of Cultural Resources, Seashore; MA, Architecture, University of California, Berkeley; BA, Environmental Design, University of California, Berkeley.

Tamara Williams, Hydrologist, GGNRA. BS, Geology, University of California, Davis.

List of Agencies and Organizations to Whom Notices of the Environmental Impact Statement/Environmental Impact Report are Being Sent

The environmental compliance document will be placed on the Point Reyes National Seashore website at www.nps.gov/pore/parkmgmt/planning. A notice will be mailed to all individuals that have indicated interest in Seashore planning and management activities.

Federal Agencies

U. S. Army Corps of Engineers
U. S. Coast Guard
U. S. Department of Commerce, National Oceanic and Atmospheric Administration – National Marine Fisheries Service
Gulf of the Farallones National Marine Sanctuary
U. S. Environmental Protection Agency
U. S. Geological Service
U. S. Fish and Wildlife Service
U. S. Natural Resources Conservation Service

Federal Advisory Groups

Advisory Council for Historic Preservation

Elected Officials

California State Assemblyperson Joe Nation
California State Senator John Burton
Marin County Supervisor Steve Kinsey
U. S. Representative Lynn Woolsey
U. S. Senator Barbara Boxer
U. S. Senator Dianne Feinstein

State Agencies and Organizations

State Clearinghouse
Bodega Marine Lab
California Coastal Commission
San Francisco Regional Water Quality Control Board
State of California Department of Fish and Game
State of California Department of Transportation
State of California Office of Planning and Research
State Historic Preservation Office
State Native American Heritage Commission

Regional, County, and Municipal Agencies

Bolinas Fire Department
Bolinas Community Public Utility District
Inverness Fire Department
Marin County Department of Public Works
Marin County Open Space
Marin County Resource Conservation District
Marin Municipal Water District
North Marin Water District

Non-Governmental Organizations, Non-Profit Organizations, etc.

Audubon Canyon Ranch & Cypress Grove Preserve
Audubon Society, Marin Chapter
Bay Area Ridge Trail Council
Bay Institute
Bicycle Trails Council
Bolinas Community Parks Planning
California Native Plant Society
Coastwalk
Committee for the Preservation of Tule Elk
Defenders of Wildlife
East Shore Planning Group
Environmental Action Committee of West Marin
Environmental Forum of Marin
Federated Indians of Graton Rancheria
Friends of the Estero
Gardener's Guild
Inverness Association
Inverness Ridge Association
Marin Agricultural Land Trust
Marin Audubon Society
Marin Conservation League
Marin County Farm Bureau
Marin Horse Council
National Parks and Conservation Association

North American Trail Ride Conference
Planning and Conservation League
Point Reyes Bird Observatory
Point Reyes Light
Point Reyes Seashore Rancher's Association
Point Reyes Village Association
Preserve Historic Olema Valley
Sierra Club, Marin Chapter
Sonoma Horse Council
Sonoma County Farm Bureau
Sustainable Conservation
Tomales Bay Advisory Committee
Tomales Bay Watershed Council
Trout Unlimited
Trust for Public Lands
Vedanta Society
West Marin Chamber of Commerce
West Marin Community Radio
West Marin Paths
Wilderness Society

Libraries

Bolinas Library
Inverness Library
Marin County Library
Point Reyes Library
Stinson Beach Library
San Rafael Library

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
Purpose and Objectives	
C-1	The Park Service should retain the original purpose of the project that was to remove non-compatible agricultural uses, enhance view opportunities, preclude future development, and create clear undistorted project boundaries.
	Response: As discussed in Chapter 1 of the DEIS/EIR, when the National Park Service (Park Service) signed the Memorandum of Understanding with the California Department of Transportation (CalTrans), the California Coastal Commission (CCC), and the Gulf of the Farallones National Marine Sanctuary (GFNMS), it stated that the purpose of the future project would be "restoring freshwater and saltwater wetlands." While the legal agreement between CalTrans and the park only obliges the park to mitigate 3.6 acres, all agencies agreed that more fully restoring lands on the acquired property was the ultimate goal, and the MOU called for restoration of a "significant portion" of the historic marsh. Transfer of the mitigation money to the Park Service was approved by the CCC on the condition that the Park Service would either create subtidal and intertidal habitat comparable in character to the area that was impacted by the road repair on State Route 1 near Lone Tree Creek OR restore previously degraded or filled marine or the removal of historic fill, improvement of water circulation, and such other steps as will create or improve habitat for fish, water birds, and other marine or marine-related species. In a separate agreement with the Park Service, CalTrans also stipulated that restoration on the Giacomini Ranch would be in a "manner consistent with the general plan set forth in the feasibility study (PWA et al. 1993). The feasibility study (PWA et al. 1993) established a number of restoration goals, none of which included the objectives listed in the comment letter. During the initial scoping period for the proposed project, the agencies took into account the mitigation requirements imposed by the MOU and agreement with CalTrans and developed a project purpose that refined and improved upon the Park Service's original stated goal of restoring freshwater and saltwater wetland such that natural hydrologic and ecological processes and functions would be restored in a significant portion of the Project Area.
C-2	***Concern Statement (Project Purpose and Priority for Restoration vs. Public Access)***: Several commenters stressed that they felt that restoration of natural processes and habitats should be primary objective of the proposed project, not public access. Restoration should be a priority for improving water quality in Tomales Bay and for special status species habitat, which the Park Service has a legal obligation to protect and enhance. Human activities would degrade wildlife habitat and wetlands, so restoration actions should minimize human activities in the Project Area, particularly in creek and riparian areas. For this reason, restoration actions should maximize natural quiet and minimize non-natural visual intrusions.
	Response: As discussed in Chapter 1 of the DEIS/EIR, the proposed project has established restoration of natural hydrologic and ecological processes and functions as the primary purpose of the proposed project. However, in keeping with the fact that "providing opportunities for appropriate public enjoyment is an important part of the Service's mission" (Park Service 2006, Section 8.1), the agencies have also incorporated provision of public access opportunities that do not conflict with the project's primary purpose as an objective of the proposed project. Although not identified as project objectives, the Park Service also places high value on preserving, to the greatest extent possible, natural soundscapes and landscapes, as well (Park Service 2006; Section 4.4.2.4 and 4.9).
C-3	Construction of the Southern Perimeter Trail violates the project's stated purpose that "public access opportunities should not conflict with the project's purpose of restoring natural hydrologic and ecological processes and functions."
	Response: The agencies felt that the southern perimeter trail would not conflict with the purpose of the project for several reasons. First, because most of the proposed trail would be in an area with an existing trail, there would be very little additional impacted expected relative to existing conditions in terms of impacts on wetlands and riparian habitat and existing wildlife habitat. Most of the actions in this area represent enhancement of existing public access facilities rather than construction of new ones. Increased visitor use of these enhanced facilities would result in only

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	negligible to minor additional impacts to hydrologic processes, riparian habitat, and wildlife use. For example, the proposed bridge over Lagunitas Creek would be developed such that there would be no footings in the creek that would impinge upon hydrologic processes during smaller flood flows. During larger flood flows, overbank topping of the Giacomini Ranch East Pasture creek bank would occur upstream of the proposed bridge, thereby decreasing flood flow velocities around the bridge infrastructure. The proposed trail was developed as a weather-dependent trail, so flooding of the bridge and associated trail would be anticipated during moderate- to large storm events.
C-4	***Concern Statement (Project Purpose and Elimination of Public Access)***: Several commenters stressed that they felt that there should be no new public access facilities constructed as part of the proposed project. Human activities would degrade wetlands and wildlife habitats, and there is enough public access within the Point Reyes-Tomales Bay area already.
	Response: As discussed in Chapter 1 of the DEIS/EIR, Park Service Management Policies directly address the recreation and educational values of wetlands, noting that, "when practicable, the Service will not simply protect, but will seek to enhance, natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions" (Park Service 2006; Section 4.6.5). By incorporating public access as a project objective, the agencies are demonstrating that they are committed to incorporating opportunities for the public to learn about the value of wetlands, the problems facing Tomales Bay, and the restoration process, as long as the opportunities do not conflict with the primary purpose of the project. In addition to incorporating trails, viewing areas, interpretative exhibits, and volunteer/educational opportunities, the Seashore and the CSLC also plan to enable people with disabilities to experience wetlands and the restoration process by providing appropriate public access facilities for those with disabilities. The agencies have developed public access opportunities that would not conflict with restoration or degrade wetland and wildlife habitats. While there are abundant public access opportunities in the Point Reyes region, including opportunities to view wetlands (e.g., Estero Trail, Muddy Hollow Trail, Coast Trail, etc.), the agencies want to enhance opportunities for the local community and Park visitors to experience and enjoy the restored wetland.
C-5	***Concern Statement (Project Purpose and Need for Public Access)***: Several commenters felt that the proposed project should include public access and opportunities to view the restored wetland. Appropriately designed public access would not degrade wetland and wildlife habitats and would improve public transportation safety and would decrease vehicular traffic and associated damage to natural resources from emissions. The Park Service is a national agency that needs to serve the American public that pays for it, not just the local community. By providing access, Americans can become more physically active and gain opportunities to learn about wetlands through interpretation and educational opportunities.
	Response: See Responses to C-2, C-3, and C-4, which address many of the points raised in Concern Statement #5. The agencies has incorporated opportunities in many of the alternatives that address the local community's previously stated desires and needs for greater public access safety and connectivity between communities. The prevalence of wetlands and privately owned lands at the perimeter of the Project Area limit opportunities to incorporate public access options in the Project Area that would provide exercise, but there are plenty of nearby through- and loop trails within the Park and on adjacent County, water district, and state park lands that would provide these types of opportunities.
Process	
C-6	***Concern Statement (Public Input***): Commenters believed that the public involvement process was inadequate. Some felt that it was biased toward local residents; others felt that it should be restricted to local residents.
	Response: In a recent study on the effectiveness of NEPA, one of the five key elements of the NEPA process that were considered critical to its effective and efficient implementation included the extent to which an agency provides information to and takes into account the views of the surrounding community and other interested members of the public during its planning and

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	decision-making process (CEQ 1997). As the study noted, the "success of a NEPA process heavily depends on whether an agency has systematically reached out to those who will be most affected by a proposal, gathered information and ideas from them, and responded to the input by modifying or adding alternatives…..' (CEQ 1997). Since the public scoping period and meeting in fall 2002, the Park Service and CSLC have incorporated numerous opportunities for public involvement, including 1) a series of alternative workshops in 2004 for agencies, adjacent landowners, and the general public; 2) public access workshops in 2005 for adjacent landowners and the general public; and 3) a public meeting and 45-day review period for the DEIS/EIR in 2007. All of these public involvement efforts included either formal or informal public comment periods. Because the Park Service is a national agency who serves people throughout the United States, scoping efforts were not limited to the local community, even though the proposed project may have the most effect on that community. While public meetings were all held in west Marin, the public scoping period in 2002 and the public comment period in 2007 were all noticed in the Federal Register, which is a nationally distributed daily publication for rules, proposed rules, and notices of federal agencies and organizations. Notices were also published in the California State Clearinghouse, which coordinates the state level review of environmental documents pursuant to the California Environmental Quality Act (CEQA), and copies of the document were distributed to select university, county, and archival libraries throughout California, as well as outside of California. Finally, notices were also mailed to the Seashore's general mailing list, which includes organizations, agencies, and people throughout California and the United States. We believe that these extensive public outreach efforts have adequately informed and involved both the local community and interested or affected members across the country.
C-7	The Park Service relied too heavily on public comment when designing and choosing alternatives rather than on scientifically defensible information.
	Response: Both the NEPA and CEQA environmental review processes encourage the incorporation of both public input and scientific information in planning, developing, and analyzing projects. CEQ requires agencies to make "diligent" efforts to involve the interested and affected public in the NEPA process (1506.6) and to "encourage and facilitate public involvement in decisions which affect the quality of the human environment" (1500.2 (d)). Under CEQA, an agency must solicit and respond to comments from the public and other agencies concerned with the project. (Title 14, Section 15002(j), also Sections 15073, 15086, 15087, and 15088.) The public has an important role in the NEPA and CEQA processes, particularly in providing input on what issues should be addressed in environmental documents, how alternatives should be added or modified, and how well the documents evaluate potential impacts of a proposed project. Scientific information is used to guide development of reasonable alternatives, evaluate existing conditions, and, perhaps most importantly, evaluate the potential environmental and social consequences of proposed projects. NEPA requires an objective, high-quality scientific analysis of impacts that the proposal or its alternatives may create (1500.1 (b)). CEQA requires that decisions be informed and balanced (Title 14, Section 15003(j)), although it does not require "technical perfection" (Title 14, Section 15003 (i)). As guided by these sections of code, the agencies incorporated both public input and scientific information during the appropriate stage or part of the planning process.
C-8	Is the DEIS/EIR intended to serve as the environmental review for the prospective in-stream flow dedication?
	Response: Yes, the DEIS/EIR incorporates the environmental review for the prospective in-stream flow dedication. It is incorporated as a proposed management action common to all alternatives in Chapter 2, and the effects of the proposed in-stream dedication are evaluated under Public Services – Municipal Water Supply and Distribution.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
Impact Analysis - General	
C-9	The DEIS/R should compare impacts from a pre-disturbance baseline condition to each alternative rather than to existing conditions.
	Response: Environmental compliance documents are intended to help the interested public understand how conditions would change relative to existing conditions should one of the proposed alternative (Action Alternatives) be implemented or if no action or project (No Action) is implemented. NEPA and CEQA require that alternatives be evaluated with respect to baseline or existing conditions. The baseline is essentially a description of the affected environment at a fixed point in time, whereas the No Action alternative evaluates what would happen and what changes might occur in existing or baseline conditions, even if "No Action" is taken. Often, baseline conditions in NEPA and CEQA are established as the conditions that existed at the time the Notice of Intent or Notice of Preparation was issued. Because evaluation of potential impacts often involves technical and/or quantitative analysis of how conditions would change under various alternatives relative to existing conditions, comparison of each alternative to some historical baseline condition would be difficult, because there is not enough information available typically to accurately describe resource conditions during that period of time. However, while NEPA and CEQA guidance do not support using pre-disturbance conditions for evaluating the intensity of impacts, the agencies notes that restoration is a purpose of the proposed project and the objective of taking action and, therefore, the alternative comparison at the end of Chapter 2 and the impact evaluation in Chapter 4 does provide a considerable amount of comparison between alternatives under the various impact topics.
C-10	***Concern Statement (Land Use - General and Agricultural)***: One commenter felt that limiting public access would help to better preserve the historic character of Point Reyes Station. Another commenter felt that restoration would unacceptably reduce the amount of land devoted to agriculture. A third felt that the expanded range of thresholds used to evaluate impacts to agricultural lands based on the Land Evaluation and Site Analysis needed to be better explained.
	Response: The DEIS/EIR addresses these topics under Land Use and Planning. Under CEQA, the County of Marin requires agencies to address how projects would comply with local land use policies, including whether the project would "result in substantial alteration of the character or functioning of the community or present or planned future use of an area." In Chapter 4, Land Use and Planning – General, the DEIS/EIR notes that the proposed project would result in no more than minor changes to the character of the community. It also evaluates how the proposed project would affect agricultural land uses and the viability of agriculture in West Marin. The EIS/EIR uses a quantitative approach to evaluate impacts to Agricultural Resources, Operations, or Adjacent Agricultural Land Uses developed by the State Department of Conservation called the Land Evaluation and Site Analysis (LESA). Based on the results of the LESA analysis, the proposed project would have no more than minor impacts on adjacent agricultural land uses. A more complete description of this analysis can be found in Chapter 4, Land Use and Planning – Agricultural Land Use and, in the Final EIS/EIR, Appendix C. These sections have also been updated to include a more complete explanation of the thresholds used to evaluate and categorize impacts as "Negligible," "Minor," "Moderate," and "Major or Substantial."
C-11	***Concern Statement (Air Resources - Air Quality)***: One commenter requested that the document include the projected N0x emissions from the proposed project and whether it conforms to the State Implementation Plan (SIP): this information is needed to demonstrate compliance with the SIP. Another felt that the DEIS/R did not adequately address impacts to air quality from dust and construction vehicles traveling over sandy roads and that these impacts should be mitigated through spraying of construction roads with water.
	Response: The DEIS/EIR addresses these topics under Chapter 4, Air Resources – Air Quality. In response to the comment on projected NOx emissions, the agencies have added a table in the FEIS/EIR that shows projected emissions of all pollutants emitted during construction and implementation of the proposed project. The agencies have also incorporated additional discussion in the FEIS/EIR regarding whether alternatives conform to the State Implementation Plan (SIP). According to Bay Area Air Quality Management District (BAAQMD), fine particulate

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	matter (PM10) or dust is the pollutant of greatest concern with respect to construction activities (BAAQMD 1999). The analysis of potential air quality impacts under Chapter 4, Air Resources-Air Quality does address generation of dust or PM10 during construction. Based on the amount of cubic yards of material excavated, the impacts would be considered negligible under every alternative. In addition, the agencies would be implementing Best Management Practices or Mitigation Measures designed to reduce the generation of dust or PM10, including, where possible, use of water trucks to spray down major construction routes. More detail on mitigation measures related to Air Quality can be found in Chapter 2 – Impact Avoidance and Mitigation Measures and Chapter 4 – Air Resources – Air Quality, Proposed Mitigation Measures.
C-12	***Concern Statement (Air Resources - Noise and Soundscapes)***: At least one commenter felt that the DEIS/EIR did not adequately disclose or mitigate noise impacts from construction of the proposed project to local residences. Another commenter noted that there would be noise impacts to residences along Levee Road whether the southern perimeter trail was routed across a bridge across Lagunitas Creek or on Levee Road and across the Green Bridge (see Alternatives Eliminated).
	Response: We disagree that the analysis of noise impacts is inadequate or that mitigation has not been thoroughly discussed or disclosed. The DEIS/EIR addresses impacts from construction noise to all residential areas on the Project Area perimeter and has disclosed that impacts in areas could be Major or Substantial, if they are not mitigated. Within very specific areas that are directly adjacent to construction zones, which are called sensitive construction areas in the DEIS/EIR, construction contractors would be required to implement noise-reducing Best Management Practices (BMP). Within sensitive construction zones, construction would be limited to the hours of 8 a.m. and 6 p.m. Monday through Friday, with weekends only permissible under authorization by the Park Service and CSLC. All equipment would have sound control devices that are no less effective than those provided by the original equipment and would have muffled exhaust. In addition, contractor would be required to maintain properly tuned equipment and limit idling time to 5 minutes and limit the number of concurrently operating pieces of construction equipment within the Sensitive Construction Area. In addition, the Construction Manager would notify adjacent residences in advance of construction and, if properly notified, potentially reschedule construction activities. These mitigation measures would be expected to reduce, but not necessarily eliminate, impacts from noise to certain sensitive noise receptors or residences, which is signified within the DEIS/EIR by the fact that impacts after mitigation are characterized as "Moderate" or "Less than Significant," but not No Impact. Unfortunately, there are no mitigation measures available that would completely eliminate impacts during construction. In terms of the second comment, noise impacts from public access along Levee Road and the Green Bridge were not evaluated, because this particular alternative was eliminated from at least project-level evaluation in this document. In the FEIS/EIR, Alternative D now incorporates the potential for the Park Service to work cooperatively with the County of Marin on expanding public access on the southern perimeter of the Project Area, including potentially reevaluating use and improvement of Levee Road in a future environmental document. See C-103 for more detail.
C-13	The Park Service should be aware of a potential for willow tree invasion from south of the Project Area.
	Response: This stand of willow was mapped both as part of the vegetation and wetland maps prepared for the proposed project. This stand of willow appears to be sustained by sheetflow and pooling of groundwater that emerges at the base of the Point Reyes Mesa slope. While it is possible that this willow stand would expand westward were there less public access use of the Green Bridge County park, it is likely that, even without trails, the stand would not expand much further westward, because it is at the extent of its current limit given existing hydrologic patterns and high elevations currently present in the Green Bridge County park.
C-14	***Concern Statement (Vegetation Resources - Public Access Impacts)***: Several commenters felt that inclusion of public access would degrade natural habitats, particularly those sited along riparian corridors. A few questioned whether some of the proposed trails would violate County, Local Coastal Plan, Point Reyes Community Plan, or California Department of Fish and Game policies by intruding into and potentially degrading riparian habitat. At least one felt that the Park Service should offer

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	protection for those habitats that would surpass that of local policies. Another commenter was concerned that the bridge across Lagunitas Creek would create additional pressure to build more trails that would intrude further into wetlands.
	Response: As noted under C-2, most of the public access trails proposed in riparian corridors are actually improvements of existing trails or roads and would not involve removal or destruction of existing riparian habitat, with the possible exception of a the eastern perimeter through-trail under Alternatives A and B and the bridge proposed under Alternatives A – C. Also, the possible extension of the southern perimeter trail to Inverness Park in the future could result in loss of riparian vegetation along the eastern edge of Sir Francis Drake Boulevard. While the above referenced policies are discussed in Chapters 3 and 4, Vegetation Resources, we have added information to supplement the discussion of impacts to these policies in response to commenters' concerns. To summarize this additional analysis, some of the proposed trails could violate Local Coastal Plan and Point Reyes Station Community Plan policies or objectives on development within riparian and Point Reyes Mesa bluff corridors, specifically Alternatives A and B. A more complete discussion of this issue can be found in Chapter 4, Vegetation Resources, of the FEIS/EIR.
C-15	***Concern Statement (Fish and Wildlife Resources- Noise-Related Impacts)***: Several commenters felt that noise from public access facilities would adversely impact use of the restored Project Area by wildlife. Public access sited along riparian corridors would also unacceptably degrade wildlife habitat. At least one commenter felt that the DEIS/EIR was inadequate, because it did not fully disclose negative impacts to wildlife and their habitats from trails. Another questioned whether the document had adequately studied the potential for cumulative impacts to wildlife from viewing areas in both the Park Service and County-managed lands. This commenter felt that the total number of viewing areas needed to be maintained at existing levels to ensure that there was no increase in cumulative impacts.
	Response: Analysis of changes in wildlife habitat and use did take into account potential disturbance from visitation, however, because changes are evaluated relative to the continuation of existing conditions, which, in this case, involved operation of a dairy, with several herds or strings, operation of All-Terrain Vehicles (ATVs), backhoes, trucks, and other farm equipment, the impacts of public access were considered relatively minor by comparison and overshadowed by the improvement yielded by the shift from a dairy to a park. Similarly, impacts to wildlife from visitation are also evaluated relative to continuation of existing public access conditions. These existing conditions include evaluation of existing public access and associated impacts on both Park Service (Giacomini Ranch East Pasture and West Pasture north levee, Tomales Bay Trail, Olema Marsh) lands and County park (White House Pool and Green Bridge County parks) lands. This means that the increase in impacts that may occur from adding more viewing opportunities to an area with established viewing areas at White House Pool and Green Bridge County parks is actually assessed as a project impact in the DEIS/EIR rather than a cumulative impact. Relative to the degree of existing use and viewing, increases in visitation were characterized as causing no more than minor additional impacts to wildlife habitat and use. To ensure that these conclusions are clear to the reader, some clarifying language has been incorporated into the discussion in Chapter 4, Fish and Wildlife Resources.
C-16	The impact analysis for salmonids under Fish & Wildlife appears incorrect, because Alternatives C and D are both considered to offer the same increase in aquatic edge habitat even though there's an increase in tidal channel creation under Alternative D.
	Response: As described in Chapter 2 of the DEIS/EIR, there is actually a small increase in creek creation and a small decrease in tidal creek creation under Alternative D relative to Alternative C. While Tomasini Creek would be fully realigned into one of its historic alignments, creating more total creek and backwater channel relative to Alternative C, much of the upper portion of the new Tomasini Creek within the Project Area would be only tidally influenced in the late summer and early fall when freshwater flows drop and would, therefore, would not be considered a tidal creek. In addition, the small starter tidal creek off Lagunitas Creek proposed in Alternative C was not included under Alternative D in the DEIS/EIR. However, based on the impact thresholds

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	established, Alternatives C and D were considered comparable, because both would offer a Major or Substantial beneficial improvement or more than 50 percent increase in the extent of aquatic edge available as rearing habitat for salmonids. In the FEIS/EIR, Alternative D has been modified to include the small starter channel, so the total amount of tidal channel creation would be approximately equal between Alternatives C and D.
C-17	***Concern Statement (Public Health and Safety - Disease Vectors)***: One agency commented that the interim restoration period and certain components of the post-construction Project Area such as the freshwater marsh in the East Pasture would require close monitoring to ensure that mosquito breeding conditions are not exacerbated. Mitigation for an increase in mosquito numbers, particularly those of the *Culex* genus, should include control efforts, as well as vegetation and nutrient management plan.
	Response: Based on Park Service Management Policies (2006), native organisms such as mosquitoes that are often by perceived by the public as "pests" are viewed as natural elements of the ecosystem and are allowed to function unimpeded, except under certain conditions. One of these conditions under which native organisms are controlled or managed includes when they pose a human health hazard as determined by agencies such as the U.S. Public Health Service (Centers for Disease Control or the Park Service public health programs; Park Service 2006, Section 4.4.5.1). The Park Service uses an Integrated Pest Management Program to reduce the risk to the public, park resources, and the environment from pests and pest-related management strategies (Park Service 2006, Section 4.4.5.2). Normally, source reduction--eliminating or altering the water so that the mosquitoes cannot breed or complete their life cycle--is the first choice for control (Park Service, IPM Manual). If source reduction is impossible or incomplete, the next tactic to consider should be biological control of the larvae with predators, bacterial insecticides, or growth regulators (Park Service, IPM Manual). Source reduction and vegetation management would not be considered a viable strategy for natural areas, including restored or created habitats such as the freshwater marsh in the East Pasture that is being specifically constructed to pond for a sufficient duration to create habitat for breeding of federally threatened California red-legged frog (*Rana aurora draytonii*). The Park Service would either monitor this area itself or amend its current permit with the Marin-Sonoma Mosquito & Vector Control District (District) such that it could monitor this area, which is adjacent to a rural residential area. Based on the Seashore's West Nile Virus Standard Operating Procedure (SOP), the Seashore would then review monitoring results and decide whether to treat with *Bacillus thuringiensis* (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable, and does not have measurable effects on other species.
C-18	***Concern Statement (Public Services - Traffic and Transportation- Traffic)***: Several commenters were concerned that the proposed project would increase traffic and congestion in what they felt was an already heavily visited area. Specific traffic concerns raised included whether traffic impacts had been addressed; impacts from construction of the southern perimeter trail; monitoring of traffic and parking availability in Point Reyes Station and mitigation for impacts if they should occur; and the accuracy of concluding that public access would decrease vehicular traffic.
	Response: The DEIS/EIR evaluates impacts to traffic and transportation that would result from potential increases in visitation associated with construction or improvement of public access facilities, as well as from construction of the proposed restoration and public access components, specifically hauling of excavated sediment, mobilization and demobilization of construction equipment, commuting of construction personnel, and traffic delays and temporary road closures caused by construction. The evaluation of impacts did not assume that public access would decrease vehicular traffic. Rather, it assumed that there would be an increase because of increased visitation. However, this increase would be negligible to minor for all alternatives, because the limited through-trail connectivity offered would be less likely to attract visitors interested in longer or more strenuous visitor experiences, and because some local residents would walk or bike to the trails rather than drive. The increase in visitation could cause moderate impacts on parking demand in Point Reyes Station under Alternatives A and B, but some of these impacts were reduced under Alternatives C and D by relocating the existing 3rd and C Street

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	trailhead to the Green Bridge. Because of the relatively minor effects on traffic that would be anticipated to occur, a traffic study and additional mitigation measures are not considered warranted, particularly since there has been a relatively recent traffic study conducted in Point Reyes Station for the Point Reyes Affordable Housing Project (EDAW 2001).
C-19	***Concern Statement (Public Services - Traffic and Transportation-Safety)***: Many commenters brought up the issue of public safety with regards to public access and the proposed siting of public access in various areas of the Project Area. These comments either addressed how proposed public access facilities would increase public safety or would decrease public safety (e.g., siting of Mesa Road spur trail and parking lot off Mesa Road, which has no sidewalk). One commenter stated that the DEIS/EIR was inadequate, because it did not cite levels of bicycle accidents in West Marin and show that safety for public access is currently minimal under existing conditions. Another commenter felt that Alternative C was undesirable, because it could decrease safety for pedestrians by increasing the number of weekend bicycle riders in the Project Area.
	Response: Additional information to address these specific concerns, e.g., the potential for conflict between pedestrians, bicyclists, and cars, has been added to the Visitor and Resident Experience - Public Access Resources of the FEIS/EIR. To summarize that additional information, the proposed project would be expected to have no more than a minor adverse effect on public safety related to factors such as increased usage of roads and road shoulders to access or connect to constructed or improved public access facilities.
C-20	***Concern Statement (Public Services - Municipal Water Supply and Distribution)***: One agency commented that the DEIS/EIR does not adequately evaluate and mitigate for potential impacts to the municipal water supply system from potential increases in salinity intrusion. The document does not adequately discuss: 1) the potential effect of salinity intrusion on the quality of drinking water, specifically the creation of disinfection by-products through the combination of chlorides with the sodium hypochlorite used for disinfection and 2) potential impacts during drought, as well as normal streamflow years. The mitigation measures proposed do not appear adequate to mitigate for potential impacts. The agency suggests that adequate mitigation might involve the Park Service funding an extension of the existing pipeline to the well at the Gallagher Ranch for use during periods when the Coast Guard wells could be impacted by salinity intrusion.
	Response: The agencies have responded to the agency's comments in the following ways: 1) Chapters 3 and 4 have been revised to clarify that salinity intrusion has negative effects on the municipal water supply by not only affecting the taste, but through the creation of disinfection by-products that are also regulated by the California Department of Health Services; 2) The methodology used to evaluate impacts in Chapter 4, Public Services – Municipal Water Supply and Distribution, has been revised to incorporate the potential changes in creek salinities during drought and average-flow periods, and, where necessary, the intensity and nature of impacts have been changed accordingly; 3) Based on hydrodynamic modeling conducted for each of the alternatives, most of the potential impacts from salinity intrusion appear to be caused by incorporation of Olema Marsh into the restoration project. Under Alternatives C and D, hydrologic connectivity of Olema Marsh with Lagunitas Creek would be restored, thereby increasing tidal prism or the volume of tidally influenced waters stored within and discharged during ebb tides from the marsh into Lagunitas Creek. While the prism of Olema Marsh is relatively small compared to Giacomini Ranch, the location of its confluence with Lagunitas Creek is located considerably upstream of that for the Giacomini Ranch, which appears to increase the effect it has on salinities within upstream sections of Lagunitas Creek. Modeling results suggest that, under Alternatives C and D, average chloride concentrations in this reach of Lagunitas Creek would increase by 32 percent over baseline conditions during spring or high tide conditions (>5.5 feet MLLW) under normal-year flows and 27 percent under dry-year streamflow conditions, respectively (KHE 2006a). These impacts would not be expected to alter the quality of the municipal groundwater supply, but rather to affect municipal water supply operations in that it could increase the need for, if not the frequency of, off-tide pumping and the time and freshwater recharge needed to reduce creek-derived chlorides

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	within the aquifer. NMWD currently conducts off-tide pumping during tides greater than 5.9 – to 6.0 feet MLLW to minimize the potential for salinity or chloride intrusion into the groundwater supply system. As noted in the mitigation measures proposed under Alternatives C and D, the agencies have proposed to delay implementation of the major Olema Marsh adaptive restoration elements until: 1) monitoring and further investigation of the relationship between Lagunitas Creek and the alluvial aquifer suggest that increased surface water salinities would not pose a threat to the quality of the municipal water supply; 2) there is new information suggesting that restoration of Olema Marsh would not increase salinities or otherwise pose a threat to the quality of the municipal water supply; or 3) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. These major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements such that they would only be implemented if initial stage restoration elements did not achieve the desired degree of hydraulic connectivity between Olema Marsh and Lagunitas Creek. As it has done throughout the planning process, the Park Service will continue to meet and work cooperatively with NMWD in trying to gain a better understanding of the dynamics of this complex hydrologic system and to ensure that there are no impacts to municipal water supply from implementation of the proposed project.
C-21	***Concern Statement (Visitor Experience - Public Access)***: Several commenters felt that DEIS/EIR is deficient in assessing the potential impacts of the proposed project on trails and facilities such as bathrooms that are maintained and managed by other agencies such as the County.
	Response: This impact topic was previously addressed under Land Use and Planning – General Land Use as one of the CEQA thresholds contained in the County of Marin's CEQA checklist. In the FEIS/EIR, the discussion of this topic has been expanded and changed to an impact sub-topic in the Visitor and Resident Experience – Public Access Resources section. To summarize this information, some of the public access components proposed under some of the alternatives would affect facilities owned and/or managed by other agencies, specifically the County of Marin Parks and Open Space District's White House Pool and Green Bridge County parks. Effects on these facilities would be expected, however, to be no more than minor and not to substantially degrade or to accelerate degradation of physical facilities.
C-22	***Concern Statement (Visitor Experience - Visual Resources)***: Several commenters felt that transportation corridors, including the proposed bridge over Lagunitas Creek, would degrade scenic views and be aesthetically intrusive. At least one commenter felt that the DEIS/EIR incorrectly characterized the stand of willows that grows on the east side of the Green Bridge County park as being negatively viewed by adjacent landowners.
	Response: With a few exceptions, most of the public access components involve improvement to existing trail or road facilities and would, therefore, not constitute more than a minor impact on visual resources. One of the exceptions is the non-vehicular bridge proposed under Alternatives A-C. As discussed under C-27 below, the height of the bridge would need to exceed 16- to 17-feet NAVD88 to allow conveyance of 10-year flood event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows, including the 1- to 2-feet of freeboard that is typically incorporated. Elevation of adjacent lands in White House Pool County park are approximately 11 feet NAVD88, so the bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade. The bridge would be specifically be designed to visual impacts by building it so that it does not exceed the maximum height of the adjacent 30-foot-high tree canopy or 41 feet NAVD88. In terms of the willows that grow along the eastern perimeter of the Green Bridge County park, the agencies had received comments during earlier public scoping and informal comment periods that suggested that some of the adjacent landowners perceive the willows as an impediment to viewscapes within that particular portion of the Project Area.
C-23	Alternative C will increase noise, traffic, pollution, and/or congestion in residential areas and impinge on ecological processes.
	Response: Please see the following sections of Chapter 4 of the DEIS/EIR for analyses of these

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	impacts: Air Resources – Air Quality; Air Resources – Noise and Soundscapes; Public Services – Traffic and Transportation; Vegetation Resources; and Fish and Wildlife Resources. Alternative C would potentially increase noise, traffic, and pollution, but this increase would be relatively minor: any potential major or significant impacts during construction would be mitigated to moderate or less-than-significant levels. The agencies believe, however, that Alternative C would not impinge ecological processes, but that it would restore natural hydrologic and ecological processes and functions to a significant portion of the Project Area.
Impact Analysis – Hydrologic and Hydraulic Processes and Flooding	
C-24	Water emerging from sub-street drainages under 4th Street, Point Reyes Station, is hydrologically connected to the restoration project; the DEIS/R inappropriately fails to address this connection.
	Response: In Chapter 3, Water Resources – Hydraulic and Hydrologic Processes, the DEIS/EIR references emergence of hillside springs or seep flow from the base of the Point Reyes Mesa. It is likely that water emerging from underneath C Street near 4th Street onto the Giacomini Ranch dairy lot represents one of these groundwater seeps or springs. This groundwater source is evident in many areas on the perimeter of the Mesa by the establishment of dense riparian scrub and marshy areas on the edges of the Mesa or even on its slopes. Discussions with groundwater well drillers in the area and site investigations suggest that the source of these seeps and springs is one or more of the shallower water-bearing alluvial layers that have been documented by groundwater well development in the Point Reyes Mesa terrace. Natural groundwater influences in many of these areas have probably been augmented to some degree by septic systems from the relatively densely populated developments on the top of the Point Reyes Mesa and, in some areas, by non-point source run-off from the town of Point Reyes Station.
C-25	The DEIS/R does not adequately address the effects of sea-level rise.
	Response: Sea-level rise is addressed in both Chapters 3 and 4 of the DEIS/EIR. In Chapter 3, Water Resources – Hydraulic and Hydrologic Processes, the issue of sea-level rise is referenced under a description of Tidal Hydrologic Processes in Tomales Bay. In Chapter 4, Water Resources – Hydraulic and Hydrologic Processes, potential effects of sea-level rise are addressed for each alternative under Tidal Prism. In addition, indirect impacts of this issue are also addressed under Vegetation Resources, Fish and Wildlife Resources, and Public Health and Safety – Flooding, and Public Services – Municipal Water Supply. Based on the current level of uncertainty regarding rate and intensity of sea-level rise, the agencies believe that they have adequately addressed this issue in the environmental analysis.
C-26	***Concern Statement (Mitigation of Impacts from Urban Run-Off)***: Several commenters felt that the Park Service needed to address non-point source runoff from Point Reyes Station in the DEIS/EIR and that these impacts needed to be monitored and mitigated either by the Park Service or the County.
	Response: The issue of non point source run-off is addressed in Chapter 3 of the DEIS/EIR under Water Resources – Hydraulic and Hydrologic Processes, Stormwater Run-off Sources for Project Area. Because the proposed project would not necessarily change the alignment or loading rates of the three known sources of run-off that flows into Lagunitas Creek or the Giacomini Ranch, this issue is not separately addressed in Chapter 4, although it is indirectly addressed by evaluation of the improvement over time in downstream loading rates from Lagunitas Creek into Tomales Bay and in the quality of waters within the Giacomini Ranch East Pasture. The San Francisco Regional Water Quality Control Board has done some monitoring of pollutant loads within these run-off sources (RWQCB 2001). As part of the long-term monitoring program, the Park Service has monitored some of the downstream receiving waters within the Giacomini Ranch (Parsons, *in prep*.). Reduction in pollutant loading within these run-off sources would need to be addressed by agencies responsible for maintaining the stormwater run-off system within the town of Point Reyes Station. In addition, residents could help to decrease pollutant loading through decreasing fertilization of lawns, washing of cars, and other activities that lead to introduction of pollutants into urban run-off.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
C-27	Creation of a bridge across Lagunitas Creek will impede **natural hydrological processes**.
	Response: The pedestrian-bicycle bridge proposed under Alternatives A-C would affect hydrologic processes, however, as described in Chapter 4, Public Health and Safety – Flooding, the bridge has specifically been to minimize its impacts on these processes. It would be designed to accommodate flows equal to or greater than those conveyed by the vehicular Green Bridge directly upstream of the Project Area, which only floods under the largest storms. The height of the bridge would be high enough to allow most small to moderate flood flows to pass underneath. During larger storms, the bridge would be inundated such that flows would pass over the deck, but flow velocities would be reduced in this reach relative to upstream locations, because overbank flooding would have occurred, thereby dissipating the erosive energy of flood flows. Based on expected flood elevations in this reach (KHE 2006a), height of the bridge would need to exceed 16- to 17- feet NAVD88 to allow conveyance of 10-year flood event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows. Bridge heights would need to be raised 1- to 2-feet additional vertical feet in order to provide needed freeboard. The southern perimeter trail has been specifically designed as a weather-dependent trail, so public access components would not be designed to necessarily allow access under all conditions. The bridge was specifically proposed for this location, because this particular reach was narrow enough to allow the bridge to be constructed without footings in the active channel or portion of the floodplain that would be flooded on a frequent basis (~every 1.5 – to 2 years). Most of the adverse impacts from bridges come from installation of footings in the channel or active/bankfull floodplain of creeks, so hydrologists recommend creating bridges that span the active floodplain where possible. The amount of armoring or riprapping would be the minimal amount necessary required to protect the footings. This portion of the estuary is a dynamic system, and, so, to some degree, public access would need to be dynamic, too. Should at some point flood flows negatively affect the trail or bridge, public access alignments and infrastructure would be modified to adapt to the changed resource conditions rather than modifying the resources to fit the existing public access alignment. Because of these design features, the agencies believe that the bridge would not necessarily impede natural hydrologic processes, although installation of a bridge is always a less preferable course than finding another alternative that does not involve bridge construction.
C-28	Extensive excavation under Alternatives C and D could result in unacceptably high siltation in Tomales Bay.
	Response: Although excavation would occur under both alternatives, with more in Alternative D, impacts from siltation would be minimized by a number of factors. Most of the excavation under Alternatives C and D would come from removal of levees and construction of tidal creeks. The areal extent of excavation is actually quite limited for these activities relative to the size of the remainder of the Giacomini Ranch, which would remain vegetated following construction. There would be scraping of the top 6 inches of the southeastern portion of the East Pasture to remove weeds, but this area would be seeded and actively revegetated to some degree to minimize erosion and would only be inundated a few times a year, if that. The extent of excavation does increase under Alternative D due to lowering of higher elevation areas to active floodplain and intertidal marshplain elevations, however, this area would also be actively revegetated to minimize erosion. During construction, Best Management Practices would be employed to avoid or minimize the potential for siltation in downstream areas, including installation of siltation control fencing to capture and contain soils loosed during earthmoving and temporary water diversion measures when construction must occur at the toe or within creeks themselves. See Chapter 2 of the DEIS/EIR for more information on Impact Avoidance and Mitigation Measures.
C-29	***Concern Statement (Flooding Effects on County Parks)***: At least one agency commented that the agencies should mitigate for damage caused to County-managed public access facilities by additional flooding caused by the proposed project, including any necessary trail repairs from erosion or other damages or any need to elevate the trails to maintain access. These mitigation measures could include improvement of drainage facilities in the park and parking lot, construction of an

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	elevated boardwalk, or construction of an elevated parking lot.
	Response: Based on hydraulic modeling results, the proposed project would actually decrease vertical flood elevations in the vicinity of County-managed parks, so mitigation measures are not warranted. As described under Public Health and Safety-Flooding, hydraulic modeling conducted for the proposed project shows that all of the action alternatives (Alternatives A-D) would result in a moderate reduction of vertical flood elevations of Lagunitas Creek for the section of creek between Olema Creek and White House Pool under Alternatives A – D. During 10-year flood events, vertical flood elevations could be reduced as much as 0.5 to 0.9 feet (KHE 2006a). In addition, under Alternatives C-D, standing water levels within Olema Marsh would be reduced, which would reduce the severity of flooding of Levee Road and the southern portion of the White House Pool County park. There would be smaller reductions in vertical flood elevations for the Green Bridge County park, similar to that discussed for the eastern portion of Levee Road in Chapter 4 (KHE 2006a).
C-30	Will any of the alternatives increase the frequency or severity of flooding on the properties along the east side of Sir Francis Drake Blvd just north of the Project Area towards Inverness? If restoration actions will increase flooding, will the Park Service mitigate adverse impacts to these homeowners?
	Response: Based on hydraulic modeling results, the proposed project would not increase the frequency or severity of flooding for properties north of the Project Area. Hydraulic modeling of vertical flood elevations north of the Project Area and south of open water portions of Tomales Bay suggest that the added floodwater storage created by removing the Giacomini Ranch levees would effectively reduce vertical flood elevations across the entire Lagunitas Creek delta. For example, under Alternative C, vertical flood elevations for properties on the east side of Sir Francis Drake Boulevard directly adjacent to Fish Hatchery Creek could be 0.1 foot lower than under existing conditions, based on modeling results (KHE 2006a). Vertical flood elevations would not increase above those that currently exist under any of the alternatives. These results could change if Lagunitas Creek changed its current channel course. The levees have maintained the current channel alignment in roughly the center of the southern portion of the Bay. If levees were removed, the channel could change course and even reoccupy one of its historic alignments in what is currently the Fish Hatchery Creek channel, which is some distance west of the current channel. This alteration in channel alignment could change the effect of the proposed project in terms of the erosive energy or scour of flood flows and instantaneous peak flood levels, which may lead to damage of adjacent lands and necessitate improvement and strengthening of levees for homes on the east side of Sir Francis Drake Boulevard north of the Project Area.
C-31	Alternatives B-D propose construction of low berms around private properties immediately adjacent to the West Pasture along Sir Francis Drake Blvd; the Park Service should better describe these berms.
	Response: As described in Chapter 4, Public Health and Safety-Flooding, flooding of private properties adjacent to the West Pasture in Inverness Park by Lagunitas Creek could increase under Alternatives B-D. However, hydraulic modeling, combined with detailed topographic surveys, suggests that the effects of these increases in vertical flood elevations would be restricted to the eastern portion of properties that are undeveloped and would NOT affect homes, garages, driveways or the health and safety of residents by limiting access to or by emergency medical or other types of public service personnel. Because of this potential increase in flooding by Lagunitas Creek during certain flood events, the agencies proposed construction of low-elevation earthen berms for some of the lower elevation homes or properties as one of the potential mitigation measures. The DEIS/EIR noted that these berms would probably need to be at least 2- to 3- vertical feet in height to maintain existing flood protection during 50- to 100-year flood events. Additional detail was not provided in the DEIS/EIR, because the dimensions of the berm would depend upon which property it was being built to protect. Any berm constructed would require that the agencies contract with a geotechnical engineer to complete the necessary soil/geotechnical studies and provide design assistance. In addition, any berm design would need to take into account hydraulic issues, including the fact that most of the flooding of these homes is currently caused by tributaries draining the Inverness Ridge, which discharge flow and sediment underneath Sir

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	Francis Drake Boulevard and into the West Pasture. Berms that inhibit the passage of these material or improperly designed berms could exacerbate flooding of properties by these creeks.
C-32	Tidal inundation on the West Pasture may impact adjacent septic systems.
	Response: Implementation of the proposed project would be expected to have no adverse impact on septic systems for homes within the West Pasture (Greg Kamman, KHE, *pers. comm*.). Based on modeling results, removal of levees and increased tidal exchange would improve drainage of both tidal waters and floodwaters relative to the somewhat impounded conditions that exist currently and could actually improve functioning of septic systems by lowering local groundwater tables (G. Kamman, KHE, *pers. comm*.). See Public Services – Wastewater Treatment and Disposal in the FEIS/EIR for additional information. Septic systems for these homes are located within the apex of alluvial fans formed by sediment deposited from outflow of the numerous small perennial Inverness Ridge drainages that flow out into the West Pasture. These systems probably lie anywhere from approximately 3- to 9 feet above the extremely shallow groundwater table that underlies the West Pasture that is fed by strong surface water and groundwater flow from the Inverness Ridge. An increase in tidal exchange with Lagunitas Creek would not affect these systems, because tides would not reach the elevations of the homes and septic systems (maximum tide elevation = 7.0 feet NAVD88), and any effect on tides on the groundwater table through an increase in hydraulic pressure would be expected to be extremely localized and only extend within a few feet of creeks such as Fish Hatchery Creek (Greg Kamman, KHE, *pers. comm*.).
C-33	Various culverts along the Project Area perimeter are proposed for replacement. Before the County approves the work, it will require that detailed hydrology and hydraulic analysis be provided to ensure that the project will not result in any increased risk of flooding. It is also concerned that the project design should incorporate the County's need to maintain county road and culverts, including clearance for equipment and personnel.
	Response: Through the contract with Kamman Hydrology & Engineering, Inc. (San Rafael, CA), detailed hydrologic and hydraulic analyses have been conducted for sections of creek where culverts have been proposed for replacement under one or more alternative, specifically Bear Valley Creek at Levee Road, Bear Valley Creek at Bear Valley Road, and Tomasini Creek at Mesa Road. A specific project need and design criterion for these structures was to increase conveyance of flood flows. Another design criterion was to minimize maintenance associated with sediment accumulation. Preliminary siting, hydraulic analyses, and modeling results indicate that the conceptual designs proposed for these crossings would achieve these objectives. During the engineering and final design phase, the agencies would continue to work closely with the County to allow the County the opportunity to further review analyses and proposed designs to ensure that it meets County flood control, maintenance, and fish passage requirements.
Document Content and Structure	
C-34	***Concern Statement (Suggestions on Improvement of Document Structure)***: Several commenters had suggestions for improving the structure of the DEIS/EIR. These suggestions included: 1) a table in Chapter 2 showing acreages restored, feet of levee removed, and other parameters; 2) more tables and figures in Chapter 4 to improve the ability of the reader to compare alternatives; 3) better graphics, including typical cross-sections, to depict what public access would look like; 4) inclusion of the Land Evaluation and Site Analysis (LESA) worksheets that were used to evaluate impacts to agricultural land use and a write-up in the Appendices.
	Response: The EIS/EIR has been modified to incorporate a table in Chapter 2 that provides a comparison of the restoration and public access changes proposed under each of the proposed alternatives. Where possible, more tables have been incorporated into Chapter 4 to help readers follow changes that could potentially occur under each of alternative. The Land Evaluation and Site Analysis (LESA) worksheets – the results of which are discussed in Chapter 4, Land Use and Planning- Agricultural Land Use – have been added to the FEIS/EIR as an appendix. Because many of the proposed public access components involve relatively minor improvements to existing facilities such as conversion of earthen trail to decomposed granite, cross-sectional figures were

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	not considered warranted in many cases. The DEIS/EIR did provide an example cross-section for the low-elevation boardwalk proposed as part of the eastern perimeter through-trail, as well as an example graphic of prefabricated bridge as proposed for the southern perimeter through-trail. Because the possible extension of the southern perimeter through-trail to Inverness Park is considered in this document as a programmatic component and not as a project-level component, cross-sectional figures were not considered appropriate.
	Concern Statement (Suggestions on Improvement of Document Content): Several commenters had suggestions for improving the content of the document. These suggestions included:
C-35	*The DEIS/R did not adequately describe the relationship between Park Service and CalTrans with respect to this project, which is defined by a Memorandum of Understanding between the two parties. The Park Service failed to reproduce this MOU in the EIS/R.*
	Response: The relationship between the Park Service and the California Department of Transportation was discussed in Chapter 1 at a level of detail that the agencies believe is adequate to allow the public to understand the relationship and the Memorandum of Understanding. The agencies do not believe that incorporation of the MOU in the document is necessary for the purposes of understanding, reviewing, and commenting upon the proposed alternatives and the analysis of impacts, however, the MOU will be posted on the Seashore's web page under the Giacomini Wetland Restoration Project for those who are interested in reviewing it. Also, interested public can visit the Seashore's headquarters to review the MOU or request that the Park Service mail a copy.
C-36	*The MOU does not precisely define how much of the Giacomini Ranch would be restored to wetlands; the Park Service preferred alternative has an unacceptable bias toward ecological restoration at the expense of public access. The DEIS/R is inadequate, because it does not describe why CalTrans funds "have a link to being used to consider 'Transportation' issues on and near the subject property."*
	Response: The purpose of the agreement between the Park Service and CalTrans was to transfer obligations to mitigate impacts to aquatic habitat caused by repair of State Route 1 to the Park Service in exchange for monies for purchase and restoration of a "significant portion" of the Giacomini Ranch wetlands. In other words, the repair of State Route 1 caused impact to aquatic habitat, and CalTrans was obligated to provide off-site mitigation at another location. Because the Giacomini Ranch was located in the general vicinity of the road impact, the regulatory agencies agreed to CalTrans transferring its mitigation obligations to the Park Service in exchange for CalTrans providing monies to the Park Service for acquisition and restoration of the Giacomini Ranch. While mitigation obligations agreed to by regulatory agencies specify that only 3.6 acres of wetlands have to be restored for obligations to be fulfilled, the agreement between CalTrans and the Park Service calls for restoration of a "significant portion" of the historic marsh. Because of this, the primary purpose of the proposed project is restoration, although public access is incorporated as an objective as long as opportunities do not conflict with restoration. While CalTrans is a state of California transportation agency, there is no link between the CalTrans wetland mitigation monies and transportation issues such that the monies must be used to consider transportation issues.
C-37	*Include GFNMS as one of the political recognitions of the importance of Tomales Bay to wildlife.*
	Response: This will be incorporated into the FEIS/EIR where appropriate.
C-38	*The project background in Chapter 1 does not discuss the Park Service mission to provide opportunities for appropriate public enjoyment or the relevant Park Service Management Policies that seek to enhance natural wetland values by using them for educational, recreational, scientific, and similar purposes.*
	Response: This background information is incorporated in Chapter 1 of the DEIS/EIR under the section where the project objectives, including public access, are described.
C-39	*The DEIS/R rejects the use of the Green Bridge to be used as part of the southern perimeter trail due to the "substantial concerns" of local residents. This statement is not adequately supported in the*

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	document.
	Response: The agencies have incorporated some additional summary information on concerns of Levee Road residents regarding routing of an access alignment on Levee Road from the two technical public access studies conducted during the planning process. This alignment was included in the preliminary public access concepts, but eliminated from the final alternatives presented and was not analyzed at a project-level in the DEIS/EIR. During the early planning process, Levee Road residents voiced substantial concerns at several meetings regarding potential impacts of this alignment on noise, traffic, and public safety. Similar concerns had apparently been voiced almost two decades earlier during public scoping efforts for the West Marin Pathways Study (Wittenkeller and Associates and Copple Foreaker & Associates 1988). The Park Service recently received a joint letter from residents along Levee Road stating they would prefer that the southern perimeter trail be routed along Levee Road rather than across Lagunitas Creek via a non-vehicular bridge.
C-40	*In Chapter 3, sharp fluctuations in salinity of Lagunitas Creek during the summer are discussed, and no strong conclusion is made as to whether these events stem from natural or unnatural causes. NMWD comments that the variation can be attributed to MMWD adjusting releases from Kent Lake to maintain the flows upstream at the Samuel P. Taylor gauge while the reported data referenced here is collected at the Gallagher gage.*
	Response: This would appear to be a reasonable explanation for these fluctuations, however, because Marin Municipal Water District (MMWD) does not quantify its releases, other possible reasons for these fluctuations cannot be ruled out.
C-41	*The DEIS/R is inadequate because it does not describe that the site of the railroad grade was not wetland habitat prior to construction of the railroad.*
	Response: It is difficult to draw this conclusion because most of the information on physical and biological resources prior to construction of the railroad in the late 1800s comes from highly detailed maps prepared by U.S. Coast Survey maps that only cover low-lying intertidal areas subject to possible boat navigation. However, some of the earliest 1942 aerial photographs show riparian vegetation on the face of the Point Reyes Mesa. The presence of groundwater in the coastal marine terrace suggests that mesic vegetation such as willows have probably been present for some time, although the extent of this vegetation on the face of the Mesa could have increased since that time in response to: 1) changes in groundwater patterns and 2) berming of Tomasini Creek along the perimeter of the Mesa.
C-42	*The EIS/R does not incorporate 2005 Park Service transportation legislation.*
	Response: This information will be reviewed for applicability and, if appropriate, incorporated into the document.
	Concern Statement (Corrections of Factual Inaccuracies or Questions of Factual Accuracy in Document): Several commenters wanted to correct factual inaccuracies or questioned factual accuracy of certain statements in the document. These included:
C-43	*The Point Reyes Community Plan was published in 2001, not 2000.*
	Response: Correction incorporated.
C-44	*The zoning designation of the parcels on C Street in Point Reyes Station is incorrect in the EIS/R.*
	Response: Correction incorporated. References to "commercial residential" have been changed to "coastal residential."
C-45	*The DEIS/R noted that Value Analysis attendees included representative from GFNMS. It did not, and GFNMS would not have endorsed Alternative C as the Preferred Alternative. Please change text in ES, Chapter 1, Chapter 2, Chapter 5.*
	Response: Corrections incorporated.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
C-46	*Clarify that Cordell Bank Sanctuary does not share any marine boundaries with the Park.*
	Response: Correction incorporated.
C-47	*Correct mistakes in list of agencies owning lands in the Land Use section in Chapter 4.*
	Response: Corrections incorporated.
C-48	*The DEIS/EIR states that 2 cfs of water is pumped from the Downey Well to the Giacomini Ranch for irrigation purposes. This is incorrect. The NMWD agreement commits 1.23 cfs of irrigation water to be delivered. Actual experience has shown that the amount delivered is closer to 1 cfs.*
	Response: The Giacomini family has an appropriative water right for up to 2 cfs. NMWD's contract with the Giacomini family is for only 1.23 cfs, according to NMWD.
C-49	*In Chapter 1 under Constraints, the DEIS/EIR states saltwater intrusion conditions into groundwater wells in Point Reyes Station would not exceed current levels or any increase caused would be mitigated. It is not clear that saltwater intrusion conditions would not exceed current levels under the project alternatives, nor is it clear that the Park Service will fully mitigate any increase.*
	Response: The statement in Chapter 1 reflects one of the constraints that the agencies identified as helping to guide project planning and alternative development and design process. The agencies believe that they have fully incorporated this constraint into project planning, design, and impact analysis, as evidenced by the considerable amount of meetings with North Marin Water District staff and computer modeling that was performed to try and determine what effect the proposed project would have on salinities in upstream portions of Lagunitas Creek. The adequacy of the analysis and the proposed mitigation measures are discussed under C-20.
C-50	*In Chapter 2, it is stated that Water Right Order No. 95-17 prohibits installation of a gravel dam. The SWRCB actually directed that the Giacominis no longer install the summer dam at its former location after 1997, but does not prohibit installation of a summer dam upstream of the Green Bridge. The Giacomini family chose not to install a dam upstream but rather to pursue an agreement with NMWD for provision of these waters.*
	Response: Clarification noted and incorporated. While a dam could be installed, it should be noted that it would need to undergo full environmental compliance process prior to installation.
C-51	*In Chapters 2 and 3, it is stated that the Giacomini family has a 0.5 cfs appropriative water right and that NMWD has a water right for 0.666 cfs on Fish Hatchery Creek. NMWD questions the accuracy of these statements.*
	Response: The Giacomini family was issued an appropriative water right license for 0.5 cfs of direct diversion between April 1 and December 1 on Fish Hatchery Creek (A021371; License No. 009730) in 1971.
C-52	*In Chapter 2, the DEIS/EIR states that the NMWD's agreement with the Giacomini family would terminate with the close of the dairy. NMWD notes that it will terminate on July 1, 2008.*
	Response: Correction incorporated.
C-53	*In Chapter 3, the DEIS/EIR notes that NMWD has a water right on Bear Valley Creek. Please clarify that NMWD holds no permanent water right on Bear Valley Creek. It secured a temporary permit in 1977 for use during that year.*
	Response: Clarification noted and incorporated.
C-54	*In Chapter 3, the DEIS/EIR states that the study commissioned by NMWD in 1997 recommended implementation of the off-tide pumping practice. NMWD comments that the 1997 study recommendations did not include institution of off-tide pumping, but rather construction of a pipeline to Gallagher Ranch well.*
	Response: Correction incorporated.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
Alternatives	
C-55	Alternatives A and B do not provide adequate ecological restoration.
	Response: The Park Service's mitigation agreement with CalTrans called for restoration of a "significant" portion of the historic marsh, although, legally, the Park Service is only required to mitigate at least 3.6 acres. This language is reflected in the project purpose, which states that the purpose of the proposed project is to restore natural hydrologic and ecological processes and functions within a significant portion of the Project Area. "Significant" is not defined in the MOU with CalTrans, however, the Park Service interpreted the language as meaning a majority of the Giacomini Ranch when developing alternatives. Under Alternative A, natural hydrologic and ecological processes and functions would be restored to approximately 350 acres of the 550-acre pastures, while under Alternative B, they would be restored to all the pastures. Based on these factors, Alternatives A and B appear to meet the project purpose and provide adequate ecological restoration, although, as noted in the DEIS/EIR, neither was the preferred alternative.
	Concern Statement (*Changes to Alternatives or Preferred Alternatives*): A number of commenters submitted comments regarding changes to alternatives or changes to the preferred alternatives. Many of the changes proposed to specific restoration or public access components are discussed in separate sub-sections below. Changes proposed to the structure of alternatives and to the choice of preferred alternative are synopsized below.
C-56	*The Park Service should implement the preferred alternative, Alternative C, but without the public access components along the railroad grade.*
C-57	*Alternative C should be the alternative implemented, but it should include a through-trail on the railroad grade.*
C-58	*Alternative D should be modified to eliminate the proposed spur trail extended from Railroad Point south on the railroad grade*.
	Response: The project planning team considered all comments from the public on preferences for alternatives and alternative elements, both during scoping and the DEIS/EIR review period. The agencies elected to keep the public access components on the eastern perimeter in Alternatives C and D as proposed in the DEIS/EIR with two spur trails in Alternative C and one spur trail in Alternative D. Alternatives A-D provide a balanced range of public access options on the eastern perimeter that are compatible with other restoration and public access components under each alternative.
C-59	***Concern Statement (Alternative D Should Be Preferred Alternative)***: Many commenters felt that the preferred alternative should be Alternative D.
	Response: Based on public and agency input, the agencies have shifted their preferred alternative to Alternative D, which has been modified slightly in the FEIS/EIR to reduce some of the environmental impacts associated with excavation. As discussed in Chapter 2 of the DEIS/EIR, the agencies originally selected Alternative C as the preferred alternative, even though it had identified Alternative D as the environmentally preferred alternative, because it appeared to best meet the project purpose and objectives by providing full restoration while also providing a moderate amount of public access. This combination appeared to best meet needs expressed by commenters during extensive formal and informal scoping for increased safety and connectivity between communities. However, comments from review of the DEIS/EIR appeared to be quite different during those received during scoping or early public input. Many of the comments received on the DEIS/EIR indicated were concerned that the public access components suggested under Alternatives A-C were largely incompatible with restoration and that these access components would increase traffic, noise, pollution, and change the rural character of an area already considered to be too congested by visitors on the weekend. Ultimately, the objective of incorporating public access is to provide restoration- and resource-compatible opportunities to view and enjoy the restored wetland for both able and disabled visitors and residents. Because the agencies believe that public access that is resource-compatible and that provides opportunities to view and enjoy the restored wetland for both able and disabled visitors and residents is

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	desirable, some of the modifications to Alternative D in the FEIS/EIR also include incorporation of an ADA-compliant trail component and a programmatic component for developing a southern perimeter trail system in the future in cooperation with the County of Marin.
C-60	***Concern Statement (Alternative D Should Be Preferred Alternative, but Modified to Include Bridge)***: Many commenters felt that the preferred alternative should be Alternative D, but that it should include a bridge. At least one commenter felt that the spur trails proposed in Alternative D would be "orphan" trails that would force non-vehicular traffic onto the unsafe shoulders of Levee Road.
	Response: The goal of alternatives developed and presented in the DEIS/EIR was to present a range of public access opportunities, from the extensive public access incorporated in Alternative A to the minimal public access included in Alternative D. Ultimately, the objective of incorporating public access is to provide restoration- and resource-compatible opportunities to view and enjoy the restored wetland for both able and disabled visitors and residents. In developing alternatives, the planning team created a range of restoration and public access options, and, because Alternative D represented the most restoration, the decision was made to eliminate the bridge from at least project-level consideration, because it could have negligible to minor hydrologic impacts. Based on this perspective, the limited facilities proposed under Alternative D meet this objective of the proposed project, even if they do not provide through-trail connectivity that would allow non-vehicular traffic such as bicycles to move off road shoulders such as a non-vehicular bridge over Lagunitas Creek. The issue of whether the proposed project would adversely affect public safety is now addressed as a sub-topic in the FEIS/EIR under Visitor and Resident Experience – Public Access Resources.
C-61	***Concern Statement (Alternative D Not the Most Environmental Option)***: Several commenters disagreed with the project proponent's assessment that Alternative D would be the environmentally preferred alternative. They noted that extensive grading would be disruptive to wildlife and would more air quality impacts, demand for non-renewable resources, and traffic in the local community and region.
	Response: As discussed in Chapter 2 of the DEIS/EIR, these are many of the very same issues that the project planning team brought up in evaluating which of the alternatives would be the environmentally preferred one. Ultimately, the environmental advantages of excavation were considered large enough to outweigh some of the impacts. The document notes that the project planning team thought that the environmental advantages of Alternative D over Alternative C as proposed in the DEIS/EIR were relatively slight. In the FEIS/EIR, Alternative D has been modified slightly to reduce the depth of excavation in the southwestern portion of the East Pasture, which should decrease some of its environmental impacts and increase the relative advantage that it offers over Alternative C.
C-62	The Park Service should not implement any restoration alternatives, because natural processes, such as tides and annual floods, will restore the wetlands without the expense of planned restoration.
	Response: Flood-induced erosion and lack of maintenance of levees could eventually result in unplanned breaches and degradation over time of the levee system from many portions of the Giacomini Ranch. However, this process would take decades to unfold and would both delay the hydrologic and ecological benefits that restoration would provide, as well as result in most of the levee material being swept out during flood flows to Tomales Bay, which has already been declared impaired by the RWQCB for sediment. Excessive sediment decreases water quality and clarity and contributes to continued "shallowing" of the Bay, which is already considerably shallower than it was under historic conditions. Under the proposed project, most of the excavated levee material would be hauled away to a quarry for use in restoring degraded lands: some materials would be spread across the pasturelands. This would decrease short- and long-term impacts from sediment to the Bay.
C-63	The Park Service should not implement any restoration alternatives, because construction will create unsafe conditions and too much noise for local residents.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	Response: During construction, every effort would be made to continue to allow visitor access to existing trails while ensuring the safety of visitors and adjacent residents. Because current public access occurs in specific areas and the rest of the Giacomini Ranch and Olema Marsh are not subject to public or resident access, safety concerns are somewhat reduced. The issue of noise is addressed in the DEIS/EIR in Chapter 4 and elsewhere in this response to comment summary. For most residents, construction noise should not be problematic. For those immediately adjacent to certain construction areas (called sensitive construction zones), construction-related noise impacts could be major or substantial, however, agencies have proposed mitigation measures to reduce them. Please see the revised mitigation measures in Chapter 4, Air Resources – Noise and Soundscapes, of the FEIS/EIR for more detail. On balance, although impacts from construction in some cases would still be considered moderate even with mitigation, they would be temporary and offset, in general, by the major benefits to wildlife, hydrology, vegetation, viewscapes, species of special concern, and park visitors that the proposed project would provide.
Restoration Component	
C-64	***Concern Statement (Actions to Maximize Tidal Action and the Extent of Tidal Influence)***: Several commenters discussed the need to maximize tidal action and whether excavation in the southwestern corner of the East Pasture would reasonably achieve this purpose. One commenter felt that the amount of excavation in Alternative D was not excessive. Another felt that it was excessive and that even scaled back excavation in this area should only be performed if the excavation increased the potential for restoring tidal influence into Olema Marsh.
	Response: The agencies do not think that the amount of excavation proposed is excessive. As discussed in several sections of the DEIS/EIR (Chapter 1, Chapter 2, Chapter 3, Geology), elevations within the Giacomini Ranch are much higher than many other diked wetlands within the San Francisco Bay region. Most of the pasturelands are at or slightly above what would be called mid-marsh or intertidal elevations. Excavation of the 23 acres proposed in the DEIS/EIR under Alternative D would convert more of the pasturelands that would be exposed to tidal influence during just the higher high tides or only very infrequently to marshlands that would be exposed during average high tide conditions. It would not increase the amount of intertidal mudflat or low marsh. This restoration action would only slightly increase tidal prism within the Giacomini Ranch. As such, its effect on tidal influence in Olema Marsh would also be slight, but it would probably serve to increase salinities within the marsh, if not the volume of tidally influenced waters exchanged between the marsh and Lagunitas Creek or the areal extent of tidal influence within the marsh (G. Kamman, KHE, *pers. comm*.). Excavation of this component as proposed in the DEIS/EIR would generate approximately 60,000 CY of material. In the FEIS/EIR, this component has been modified slightly to expand the areal extent of excavation (32.5 acres), but maintain the volume of excavated material (up to ~60,000 CY), but generally decreasing the average depth of excavation.
C-65	***Concern Statement (Restoration of Olema Marsh and White House Pool County park)***: Several commenters felt that Levee Road should be replaced or reconstructed to maximize connectivity of the marsh with Lagunitas Creek and the rest of the Project Area. These commenters suggested either replacing the road with a causeway or installing more culverts than proposed. One commenting group felt that, if the high elevations of the White House Pool County park were one of the reasons that Levee Road was not going to be replaced, then the Marin County Parks and Open Space District should reconsider its decision to want to preserve existing conditions of the park, because restoration of the County park could be achieved without losing any value or use of the park. This group felt that this decision should not have been made without public input. Also, this group felt that scraping of the East Pasture of the Giacomini Ranch would have little value -- and possibly a negative impact -- on efforts to restore Olema Marsh.
	Response: In developing possible restoration scenarios for Olema Marsh, the Park Service convened an informal working group with all of the affected land agencies and organizations that included Audubon Canyon Ranch (which owns more than half of Olema Marsh), County of Marin Public Works (which owns and maintains Levee Road), and County of Marin Department of Parks

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	and Open Space District (which leases and manages White House Pool County park). One of the first considerations in looking at options to restore Olema Marsh was existing topography. The Park Service commissioned a topographic survey of Olema Marsh to complement the survey that had already been performed in White House Pool County park and Levee Road by the U.S. Geological Survey. It was immediately evident that elevations throughout the County park were extremely high after years of fill and flood deposition and that they were high enough to invalidate the concept of a causeway without extensive excavation that would be extraordinarily costly, as well as have other environmental impacts. Similar constraints in terms of the amount of excavation, money, and environmental impacts would make restoration of the westernmost Olema Marsh culvert very difficult to implement. This culvert used to be the primary culvert prior to the 1998 flood, but large amounts of sediment deposition have essentially cut it off from the rest of the Olema Marsh and led to formation of a stand of juvenile riparian vegetation. These constraints were the primary factors driving the current restoration approach of using adaptive restoration to implement discrete actions that would or would not at some future point include replacement of the existing culverts for Bear Valley Creek at Levee and Bear Valley Roads. This approach would also help to reduce the severity of some of the negative impacts to the ecosystem that would be expected with an improvement hydrologic connectivity and the elimination of the water impoundment problem and the trend of steadily increasing water levels observed during the last decade. Shallow scraping of the East Pasture in its southern portion is intended only to remove vegetative, cover, and shallow roots of non-native grasses and herbs in a high-elevation upland area where inundation by salty water cannot be used to eliminate these species. It is not expected to have any effect on Olema Marsh.
C-66	***Concern Statement (Restoration of Tomasini Creek)***: Several commenters emphasized the importance of full restoration of Tomasini Creek, but some questioned the approach proposed in the project. At least one felt that the cost to benefit ratio of excavating a new channel was low when it was likely that the creek would move on its own without maintenance of the berm. Another suggested that a causeway be constructed at Mesa Road rather than replacing the culvert as proposed in Alternative D. There was also some concern on at least one commenter's part that restoring hydrologic connectivity by replacing the culvert might actually increase the amount of contaminants that are transported from upstream portions of Tomasini Creek into the restoration area: it might be better to not replace the culverts and instead maximize wetland area for contaminants that do pass through.
	Response: Under Alternative D, the alignment of Tomasini Creek is shifted into roughly what was one of its historic alignments, with the creek running through the center of the so-called Tomasini Triangle and then turning north to flow to Tomales Bay. The Tomasini Triangle is where the freshwater marsh for mitigation of impacts to the federally threatened California red-legged frog would be constructed. Therefore, the creek is aligned to run through the center of the marsh, with low vegetated berms on either side to prevent marsh waters from draining directly into the creek channel, but still allowing overflow into the marsh during high flows. However, commenters are correct that creeks such as Tomasini are dynamic systems and that it is entirely possible that the creek would migrate or jump to a new alignment on its own during a larger storm. When and if it occurs, this would be considered by the agencies to be successful restoration of natural process. Construction of the channel is only intended to give the creek a "starting point" and to foster development of the marsh during its early stages. One of the objectives for the proposed project is to improve the health of Tomales Bay. This includes acting as a filter for pollutants from upstream portions of the watershed. Currently, it is likely that some of the pollutants from the upper portions of the Tomasini Creek watershed have deposited within the somewhat artificially low gradient, depositional reach of Tomasini Creek at Mesa Road, where the undersized existing culverts have reduced hydraulic connectivity with the lower reach and encouraged a backwater effect that encourages sediment – and pollutant – deposition. While ensuring that some of the pollutants do not reach downstream portions of the watershed, this reduced connectivity has reduced other functions, including salmonid passage.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Both coho and steelhead salmon have been observed recently within this creek. The appropriate facility for replacing the existing Tomasini Creek culvert would be determined during the final design for this element, which would involve further consultation with the county. It is anticipated that it could be an arched culvert, bridge, or causeway.
C-67	***Concern Statement (Creation of Additional Tidal Channels)***: At least one commenter questioned why the Lagunitas Creek pilot channel included in the central portion of the East Pasture in Alternative C was not included in Alternative D. The commenter also suggested that some additional pilot channels could be created in the southern portion of the East Pasture.
	Response: The agencies have incorporated the pilot channel that was proposed in the DEIS/EIR under Alternative C in Alternative D in the FEIS/EIR. The topography of the Giacomini Ranch, however, restricts the ability to create these channels in the southern portion of the East Pasture, because elevations are extremely high from repeated sediment deposition during flood events (and some fill activities), and these areas function more as floodplains in the current fluvial-dominated environment.
C-68	One commenting organization urged that the scope of the project be expanded and funds set aside for opportunistic replacement of culverts along Project Area perimeter to enhance biological and hydrological connectivity.
	Response: The proposed project incorporates at least three potential replacements of culverts (Levee Road, Bear Valley Road, and Mesa Road) under Alternatives C and/or D. The agencies focused on those they felt posed the most constraint to restoration of natural hydrologic and ecological processes and functions. The Park Service would be interested in working with the County of Marin Public Works should the county identify other culverts that it owns and maintains on the project perimeter for replacement.
C-69	The Park Service should remove the 1983 rip-rap along Lagunitas Creek because it was installed immediately after a large flood and had the effect of unnaturally forcing the stream into an old alignment.
	Response: This action is included under Alternatives B-D of the DEIS/EIR.
C-70	What are the plans for removal or retention of Waldo's Dike?
	Response: In Chapter 2 of the DEIS/EIR, the document describes that the north levee of the West Pasture, which is also known as Waldo's Dike, would remain under the No Action Alternative and Alternative A and be removed under Alternatives B-D.
C-71	Will the tidegates on Fish Hatchery Creek be removed?
	Response: As noted above, the north levee of the West Pasture and the Fish Hatchery Creek tidegate would remain under the No Action Alternative and Alternative A and be removed under Alternatives B-D. The tidegate and flashboard dam structure on Tomasini Creek would be retained under all alternatives for at least 10- to 15 years until alternate habitat for the federally endangered tidewater goby (*Eucyclogobius newberryi*) has expanded within the restored marsh. Tomasini Creek is home to one of the largest occurrences of tidewater goby in the Project Area and Tomales Bay watershed.
C-72	The Project's first priority, and first action, should be to remove the northern levee on the West Pasture.
	Response: The agencies have put together a preliminary of restoration tasks that would be completed during the two separate years of project implementation, but, ultimately, the order in which tasks would be completed would be worked out with the construction contractor and would be based on a number of factors, including prohibitions on construction in the vicinity of clapper rail and black rail habitat during the breeding season.
C-73	The EIS/R conclusion that the restored wetlands will remove 2-18% of the pollutants entering the Project Area seems low; the Park Service should configure the wetland restoration project to maximize

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	pollutant uptake efficiency.
	Response: While the Park Service believes that water quality improvement could be one of the most important functions that could be restored with the proposed project, the intent of the proposed project is not to create a so-called treatment wetland, but to remove impediments to natural hydrologic and ecological processes that would promote a number of hydrologic and ecological functions, including habitat and support for wildlife, habitat for rare plants, and floodwater retention and dissipation of the erosive energy of flood flows. The estimates of removal for pollutants, which have been refined in Chapter 4 of the FEIS/EIR, refer specifically to those conveyed downstream by Lagunitas Creek and its tributaries and are based on hydraulic modeling estimations of overbank flooding rates during some of the more frequent flood events. These numbers do not take into account removal of pollutants that are conveyed by other sources and that might have higher rates of retention within the Project Area. These would include Tomasini Creek, Fish Hatchery Creek, other small West Pasture drainages, stormwater run-off that flows into the Giacomini Ranch from the town of Point Reyes Station, and potentially septic-influenced groundwater inflows.
C-74	***Concern Statement (Creation of Additional Upland Refugia)***: Commenters suggested that the agencies incorporate more high tide refugia for special status species by reusing more of the excavated soils or leaving more portions of the levees as "islands."
	Response: The agencies have incorporated this idea under Alternatives B-D by extending the high tide refugia area that was created as part of a 2006 enhancement project southward. See Chapter 2 of the FEIS/EIR for additional detail. Additional refugia would continue to exist in the East Pasture at the Tomasini Triangle created freshwater marsh retention berm and on the Tomasini Creek berm, which would not be removed, but allowed to deteriorate over time.
C-75	***Concern Statement (Restoration of Additional Areas, Including Along C Street)***: The scope of restoration component should be expanded to include more lands along C Street in Point Reyes Station and along the margin of the West Pasture. Lands proposed for exchange as part of a separate project should be retained (see Cumulative Effects analysis in Chapter 4), and the agencies should acquire additional lands that are either owned by the Giacomini family or potentially other private landowners. At least one commenter noted that water from small creeks that were buried as part of development of Point Reyes Station flows into the cattle corrals along C Street and that there is a potential to use this hydrology to expand the growth of willows along the Mesa perimeter. Also, one commenter requested that the agencies discuss with the County the potential of removing the Cypress trees that were planted by the County to obscure views of the loafing barn on the dairy.
	Response: The Park Service's MOU with CalTrans calls for a restoration of a significant portion of the Giacomini Ranch. However, it does not call for restoration of the entire ranch. In developing the proposed project, the planning team focused its efforts on where it felt that money available for restoration could yield the most ecological benefit. For the most part, these were areas in the low-lying pastures or former historic coastal marsh areas that are not directly adjacent to existing residential, commercial, and agricultural development and areas that have not been subject to intensive historic impacts such as repeated fill events that would require extensive excavation and rehabilitation before they could be considered "restored." For this reason, the agencies elected not to focus their restoration efforts on the dairy facility parcels along C Street in Point Reyes Station. They have been subject to repeated fill activities and disturbance from dairy activities. They are also directly adjacent to the town of Point Reyes Station, which would increase the likelihood of wildlife disturbance from people and domestic and feral animals. These were some of the reasons that the Park Service elected to enter discussions with the Giacomini family to exchange some of the higher-elevation C Street parcels for low-lying pasturelands that were considered to have more existing ecological value. This is a separate project that is discussed in the DEIS/EIR under Cumulative Impacts in Chapter 4. Until the fate of this proposed project is determined, the Park Service has no plans to remove the stand or row of Cypress trees along C Street, nor is it aware of any such plans by the county.
C-76	Restoration actions should proceed slowly for the protection of plants and animals.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	Response: For most alternatives, construction activities would be phased over two (2) seasons. Construction can occur within the pastures while levees remain but once the levees are breached or removed, the difficulty of performing construction in many areas would increase considerably and make it logistically complex, if not infeasible. Therefore, restoration activities cannot be feasibly implemented over a longer period of time. Because the agencies are restricting excavation to removal of levees, berms, manure-laden or "hot" soils, and weedy upland areas, most of the pastures would be expected to convert from non-native grass- and herb-dominated grasslands to a mosaic of native-dominated salt, brackish, and freshwater marsh slowly. As discussed in the DEIS/EIR under Chapter 4, Vegetation Resources, this transitional period in which grasses are slowly killed off by higher salinities and replaced by disturbance-adapted brackish and eventually salt marsh species could take as long as 10- to 15 years, although shifts in some systems have occurred as rapidly as 5 years.
C-77	The Park Service should quickly and thoroughly revegetate the Project Area after excavation.
	Response: Please see response to C-76 above. Restoration would not involve removal of vegetation cover except under Alternatives C and D in the southern portion of the East Pasture. Grassland vegetation would persist for a number of years as increased tidal influence slowly replaces salt-intolerant or marginally tolerant species with disturbance-adapted brackish marsh and, eventually in most areas, salt marsh species. Active revegetation is typically not considered necessary in areas where natural colonization would be expected to proceed quickly because of abundant seed and propagule sources and appropriate establishment environments and where non-native species are not expected to readily outcompete and exclude native species. For this reason, active revegetation is only planned for higher elevation and more disturbed areas where establishment environments are not conducive to natural community establishment, and non-native invasive species would be likely to outcompete native vegetation. These areas include high-elevation riparian floodplain terraces, high marsh/upland ecotone, dry upland grassland, and excavated and created areas.
C-78	In Alternative D, what is the purpose of constructing a "fence to limit cattle access" in the West Pasture if there will be no cattle grazing within the Project Area?
	Response: Under Alternative B in Chapter 2 of the DEIS/EIR, it notes that the Park Service earlier constructed a fence to limit cattle access to the 100-acre portion of the Giacomini Ranch in the West Pasture that has been owned **and managed** by the Park Service while the Reservation of Use Agreement with the Giacomini Ranch is still in effect. Under the Reservation of Use agreement, the Giacominis have continued to graze cows in the West Pasture, and this fence was built to preclude cattle from entering areas in the 100-acre portion of the pasture that had been enhanced through creation of freshwater marsh and high tide refugia. One of the actions under Alternatives B-D is to remove that fence. Under Alternative D, the Park Service proposes to construct a different fence to limit cattle access to the portion of the Point Reyes Mesa on the Martinelli Ranch that is directly northeast of the Giacomini Ranch, because this area could act as aestivation or breeding habitat for the northwestern pond turtle. The Martinelli family has a Reservation of Use agreement with the Park Service for beef cattle grazing on the Martinelli Ranch that extends through 2012.
C-79	The Park Service should remove abandoned structures and equipment within and adjacent to the Project Area.
	Response: As described in Chapter 2 under Alternatives A and B, the agencies have incorporated removal of agricultural infrastructure as one of the restoration components. Additional infrastructure adjacent to the Giacomini Hunt Lodge that could extend onto private property would also be removed and is described in Chapter 2, Actions Common to All Alternatives.
C-80	The Park Service should remove infrastructure, pipelines, and electrical wiring from the privately owned lands adjacent to the Giacomini Hunt Lodge.
	Response: This action has been incorporated as an alternative element common to all

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	alternatives in Chapter 2 of the FEIS/EIR.
Public Access - General	
C-81	The DEIS/R is inadequate because it does not conclude that the restoration project must include installation of transportation corridors on the margins of the Project Area.
	Response: We disagree and note that relevant plans for jurisdiction on the margin of the Project Area do not require such corridors. Instead, the draft Marin Countywide Plan (Marin County Community Development Agency 2005), the Marin County Unincorporated Area Bicycle and Pedestrian Master Plan (Alta Transportation Consulting 2001), the Local Coastal Plan (Marin County Comprehensive Planning Department 1981), and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001), recommend development of additional trails and bike paths in the Point Reyes Station-Inverness area, specifically along Sir Francis Drake Boulevard and the railroad right-of-way "where feasible" (Alta Transportation Consulting 2001). The LCP notes that recreational resources should be incorporated where "consistent with the protection of natural resources and agriculture" (Marin County Comprehensive Planning Department 1981). The LCP also directs federal parks to provide access "where feasible and where consistent with the protection of the parks' natural resources" (Marin County Comprehensive Planning Department 1981). Projects should "avoid or minimize disturbance to wetlands, necessary buffer areas, and associated important wildlife habitat" (Marin County Comprehensive Planning Department 1981).
C-82	Local, state, and federal managers should consider building additional trails, such as a trail between the Green Bridge and White House Pool via Levee Road, or along the railroad grade.
	Response: Please also see response to C-39. In the DEIS/EIR, a trail along the railroad grade is considered under Alternatives A and B. A trail between the Green Bridge and White House Pool via Levee Road was originally incorporated into Alternative D, but was eliminated on the basis of public comment from the final alternative design and is referenced under Eliminated Alternatives in Chapter 2. Since then, a considerable amount of local community members appear to support a trail in this location. This alternative will not be addressed at a project-level in the FEIS/EIR, but the agencies would entertain working with the County of Marin, which owns and maintains the Green Bridge and Levee Road, to develop some type of southern perimeter trail system.
C-83	***Concern Statement (Extension of Southern Perimeter Trail to North Levee or Inverness)***: The Project should extend the western portion of the Southern Perimeter Trail to the northern end of the Project Area and/or to Railroad Point to encourage hiking. One commenter suggested that extension of the Southern Perimeter Trail to Inverness be considered now rather than later, because construction of the trail could utilize some of the fill being created by excavation in the Giacomini Ranch.
	Response: As noted under C-82, a trail along the railroad grade to Railroad Point is considered under Alternatives A and B in the DEIS/EIR. The agencies have also proposed a programmatic component that would explore extending the southern perimeter trail to Inverness Park under Alternatives A-C. As part of some earlier public access studies, the agencies did evaluate extending the trail as far north as Drakes View Drive. However, routing of the trail near the Lucchesi/Kostelic residences poses some considerable technical challenges, because of the proximity of the road to the property boundaries and the difficulties in routing trails behind the residences because of the 1906 Drainage. This is discussed in the DEIS/EIR in Chapter 2 under Alternatives Eliminated.
C-84	The Park Service should retain at least a portion of the north levee on the West Pasture as public access.
	Response: The agencies feel that it is important to eliminate the north levee of the West Pasture for a number of reasons. First, levees that are perpendicular to the primary flow path are some of the largest impediments to hydrologic processes. Secondly, public access on the levees during extreme high and storm tides could be jeopardizing the population of state-threatened California black rails (*Laterallus jamaicensis coturniculus*) that lives in the undiked marsh north of Giacomini

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Ranch and that uses the levee for high tide refugia during those periods. The presence of people limits the amount of area available for rails to use and may increase their susceptibility to predation. With elimination of most of the levee, the amount of habitat for black rails and the federally endangered California clapper rails (*Rallus longirostris obsoletus*) would expand southward and increase considerably. The retention of some of the north-south trending or levees parallel to Lagunitas Creek would retain higher elevation areas necessary for refuge during high tides.
C-85	Maximize opportunities to create multi-use pathways that are not adjacent to roads.
	Response: The agencies have incorporated, where possible, pathways that are not adjacent to roads. However, efforts to incorporate restoration- and resource-compatible access opportunities are complicated by the fact that wetlands and riparian areas extend right up to the edge of roads. Under all of the action alternatives, the Park Service has retained most or all of the existing East Pasture trail (and adjacent Green Bridge County park trails), and, under Alternatives A-C, this is linked via a bridge to White House Pool County park trails. The bridge has been eliminated from project-level consideration under Alternative D in this document, because it was felt that more restoration-compatible alternatives for creating a southern perimeter trail system should be explored first. The issue of intended users is addressed below under C-89.
C-86	***Concern Statement (Overlooks in Public Access Component)***: The public access components should be focused on observation points such as viewing areas. At least one commenter felt that these observation points should be located away from residential areas.
	Response: The agencies have incorporated viewing and overlook areas at select locations along the Project Area perimeter where they believe that visitors and residents could have unique views of the restored wetland. These receive the most focus under Alternative D, because it does not offer a through-trail component in the Giacomini Ranch. Because residential areas surround the Project Area, it is impossible to locate viewing areas completely away from them, but the agencies believe that they have sited them in areas that provide the least disturbance to adjacent residents.
C-87	***Concern Statement (Educational Opportunities)***: Several commenters encouraged the agencies to expand educational opportunities through public access or interpretative displays. At least one commenter suggested that the agencies should retain one of the houses now owned by the Park Service in Inverness Park as an educational or interpretation facility.
	Response: The agencies are very interested in incorporating educational and interpretative opportunities through not only exhibits at viewing and overlook areas, but through programs offered through the Seashore's Interpretation Division. The house in Inverness Park has been badly damaged from years of occupancy by Giacomini Ranch workers and would require a considerable investment to allow it to be used as an educational or interpretation facility. Therefore, it is unlikely that the re-use proposed by the commenter would take place.
C-88	***Concern Statement (Width, Surfacing, and Fencing of Trails)***: Several commenters made suggestions on the types of trails or trail surfacing and fencing that should be incorporated as part of the public access component. A few commenters felt that trails should remain unimproved or be simply modest, non-vehicular trails that would appeal mainly to birdwatchers and walkers. Another felt that the trails should be surfaced with decomposed granite treated with a pine resin binder. Other commenters felt that measures should be taken to protect adjacent natural areas, either through fencing or perhaps preferably vegetative barriers that would enhance scenic views. The County of Marin requested that trails be of sufficient space and surfacing to allow all-weather access. However, one commenter requested that the County of Marin follow the Park Service lead in creating trails that are not too wide and that are environmentally sensitive.
	Response: During public access workshops, one of the most consistent comments received from members of the public regarding trails in the Project Area was that they not be paved, but be left as earthen or constructed of decomposed granite. Members of the local community felt that this would help to retain the rural character of the region. The agencies have considered a variety of

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	surfacing approaches, including earthen, decomposed granite, decomposed granite with pine resin binder, and boardwalks. The exact surfacing to be used would be decided during final design, but no paved trails would be constructed within Park Service-owned lands. Split-rail fencing and vegetative barriers would be incorporated in certain areas to ensure that people stay on trails and out of restored areas.
C-89	***Concern Statement (Intended Trail Use)***: Several commenters discussed the need for having public access that serves a variety of users, including pedestrians, bicyclists, and equestrians. There was one request for more clarification on the intended users for the various public access facilities proposed.
	Response: The agencies intend for all trails proposed within the Project Area to be multi-use or serve a variety of users, with the exception of the West Pasture north levee trail under the No Action Alternative and Alternative, which would be restricted to hikers. This is addressed in Chapter 4, Visitor and Resident Experience – Public Access Resources, and is clarified in Chapter 2 of the FEIS/EIR under the description of the public access components.
C-90	***Concern Statement (Parking)***: Many commenters took issue with the proposal to create a small (~ 5-car) parking area in the gravel lot off Mesa Road currently used by a gardening company for equipment storage for a number of reasons, including impacts to vegetation resources, wildlife, traffic, parking, public safety, noise, and other issues (See Concern Statement: Public Access - East for more detail). At least one commenter said that Alternative C was not preferable, because it created new parking areas. The Park Service should not create a trailhead in Point Reyes Station without providing adequate parking. Another felt that creation of a new parking area was not necessary, because there was already adequate parking at the elementary school on weekends and that additional parking is being created at the ecumenical housing site. Others suggested that the proposed parking area be moved either closer to town or onto Park Service lands within the Giacomini Ranch.
	Response: The agencies do not believe that conversion of the small gravel lot currently being used by a gardening company for storage of vehicles and equipment would cause impacts to vegetation resources, wildlife habitats, or wildlife, because it is currently a disturbed area. It is also distant enough from town that it is unlikely that it would be used by visitors to town as overflow parking. Most of the people parking there would be people using the some of the Eastern Perimeter facilities proposed. Impacts from visitation on traffic and noise are addressed in Chapter 4 of the DEIS/EIR under the relevant sections – Air Resources – Noise and Soundscapes and Public Services – Traffic and Transportation. Based on the analysis in the DEIS/EIR under Public Services – Traffic and Transportation/Parking, increased visitation that results from construction of public access facilities would cause no more than a minor impact in parking demand, and this minor impact would be reduced to negligible under Alternatives C and D when the Point Reyes Station trailhead is shifted from Third and C Street to the Green Bridge at State Route 1. In terms of moving the parking area, most of the Giacomini Ranch lands are either wetland or riparian area or are immediately adjacent to residences and would create potentially greater impacts.
C-91	***Concern Statement (Public Access and County Involvement)***: Several commenters felt that design, funding, and maintenance for public pathways should be undertaken jointly by the Park Service and the County of Marin. At least one commenting organization faulted the DEIS/EIR for not studying or encouraging better coordination between the Park Service, the County of Marin, and the Wildlife Conservation Board, which owns the lands that the County leases for White House Pool and Green Bridge County parks. As part of this coordination, several commenters felt that the agencies should cooperate to make signage, maintenance, and rules along the Southern Perimeter Trail generally consistent between Park Service and County-managed lands. At least one commenting organization felt that the two agencies should coordinate to make a coherent set of viewing areas so impacts to wildlife from viewing are not increased. The County of Marin commented that there was no agreement as to the division of maintenance responsibilities for trails that may exist or be built in the right-of-way and that it has not budgeted for any potential capital expenditures.
	Response: The agencies agree that certain aspects of the public access components, specifically

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	the southern perimeter trail system, are projects that necessitate inter-agency involvement and cooperation. However, we have come to recognize that this is not the right time – or this EIS/EIR, the right vehicle – to plan for this trail system. The agencies base this conclusion on recent comments submitted by the public, which show that opinion has changed dramatically regarding the use of a bridge versus use of Levee Road, as well as on comments by submitted by public agencies that suggest that further planning and coordination efforts are needed between the Park Service and the County. Based on these comments, it would appear that the southern perimeter trail system is not "ripe for decision." Under NEPA, one of the determinants of whether an applicant has a project is whether it has an action that is "ripe for decision." When all involved agencies and the public agree that it is time to move forward on planning, the Park Service would be committed to working on expanding public access facilities on the southern perimeter of the Project Area. This cooperative project would enable better planning of viewing areas and maintenance responsibilities. (It should be noted that the current DEIS/EIR does not include any trails in County right-of-ways, although the programmatic component proposed between the Park Service and County could include a trail along Sir Francis Drake Boulevard.) One of the options that could be reevaluated under this cooperative project would siting of a trail along Levee Road to the Green Bridge, where it could connect to the enhanced Green Bridge County park trail entrance proposed under Alternatives C-D. It could also include the extension to Inverness Park discussed programmatically in the DEIS/EIR under Alternatives A-C. Because this path would be entirely within the County right-of-way, it would be appropriate for the County to take the lead. The Park Service would commit to working with the County 1) on portions where the trail enters or abuts Park Service lands and 2) on raising the necessary funding. Another option would be to construct a bridge at the location of the old summer dam as is proposed currently under Alternatives A-C. However, should any of these options be chosen, a separate environmental compliance process would be required, as this component is only addressed as a future potential project under Alternative D.
C-92	Funding for the public access components of the project should be secured simultaneously with funding for ecological restoration components of the project.
	Response: The agencies were not able to secure funds simultaneously for restoration and public access components, because public access components required additional baseline studies and public scoping efforts that delayed finalization of design relative to restoration components. In addition, many of the sources that are willing to fund restoration do not also fund public access, so the agencies have to pursue different types of federal and private funding sources.
Public Access - ADA	
C-93	***Concern Statement (Public Access and ADA Components)***: Several commenters discussed the inclusion of accessible or ADA-compliant trails as part of the public access components. At least one commenter felt that Alternative D was not adequate, because it had failed to provide an ADA-compliant trail, and an ADA-compliant trail could be incorporated without compromising the environmental benefits of this alternative. Several commenters felt that the ADA-compliant pathway for all alternatives should be the one included in Alternatives A and B, which originated from C Street rather than being a spur trail originating from Mesa Road as proposed in Alternative C. Other commenters suggested that ADA-compliant access be provided at White House Pool County park, Olema Marsh, or Martinelli Open Space.
	Response: Topographic constraints for the trails incorporated under Alternative D had limited the agencies' ability to incorporate an ADA-compliant trail in this alternative. Strenuous objections by adjacent residents to the continued presence of a trailhead in the vicinity of 3rd and C Streets has pushed the planning team to incorporate a new Point Reyes Station trailhead at the Green Bridge and State Route 1 under Alternatives C and D, and this entrance is very steep and not suitable for ADA access. The Park Service explored other options on C Street, but they were not feasible. After subsequent discussions with County Parks and Open Space District, the Park Service has incorporated an ADA-compliant component at White House Pool County park under Alternative D in the FEIS/EIR. Further detail on this component can be found in Chapter 2 of the FEIS/EIR.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
Public Access - Bridge	
C-94	***Concern Statement (A Bridge Should or Should Not be Constructed)***: Many commenters stressed the importance of incorporating a bridge across Lagunitas Creek as part of the public access component. They felt that it was a high priority and should be built as soon as possible, because it would increase public safety, allow people to enjoy the restored wetlands, and reduce vehicular traffic. One commenter suggested that the bridge be named the "Sis Arndt Memorial" Bridge. Other commenters stressed the importance of eliminating the bridge from the public access component. They felt that it was not desirable, because it would disturb wildlife by increasing human activities or would impact the existing visitor experience. Some felt that it was not worth the expense, because it would not create a through-trail. There was a concern that the bridge is too costly to build and/or maintain. Some felt that this was a reason not to build a bridge; others suggested that the agencies either build a less substantial bridge or install a seasonal bridge. Another commenter felt that the main objection to building the bridge was its cost and that the agencies should raise additional funds and thereby eliminate this objection.
	Response: As the bridge is incorporated under Alternatives A-C, both the advantages and disadvantages of the bridge are addressed in Chapter 4 under various resource topics, including Fish and Wildlife Resources, Visitor and Resident Experience – Public Access Resources and Visual Resources, Vegetation Resources, Air Resources – Noise and Soundscapes, and Public Services – Traffic and Transportation. The topic of public safety is addressed in greater detail in Public Access resources section of the FEIS/EIR than it was under the DEIS/EIR, because of the number or comments relating to public safety received during the public comment period. While the bridge would not create a complete through-trail, it would offer greater connectivity. However, because it is impossible to determine how many people would not drive because of the presence of a bridge, the environmental document does NOT assume that incorporation of a bridge would reduce traffic, although it is possible that it might. The planning team did explore lower cost and seasonal options for a bridge, but concluded that a pre-fabricated bridge was best, because it is actually less costly to design and install than a designed bridge. Based on the issues expressed in C-3, C-14, C-15, and C-22, the main objection by the public to the bridge is its impact on natural resources such as wildlife, riparian habitat, and viewscapes and other environmental issues such as traffic, air pollution, and character of the local community, not the expense. Therefore, raising additional funds is not likely to eliminate these concerns. Any naming of bridges would probably occur during the final design phase at which time suggestions would be considered.
Public Access - Dog	
C-95	***Concern Statement (Dog Policies in Project Area and Adjacent County Parks)***: Many commenters addressed the topic of dogs and whether dogs would be permitted in the Project Area. Several felt that access for dogs -- and possibly other domesticated animals -- should not be allowed or at least limited, because dogs disturb wildlife. Even if leash policies are instituted, one commenter noted that dogs-on-leash policies are often not enforced, so owners allow dogs to run off-leash. Several other commenters felt that dog walking should be allowed within the Project Area. Some felt that dogs should be allowed to walk and run off-leash. Another commenter suggested that, to accommodate both ecological restoration and community needs, the agencies should fence off a portion of the Project Area as an off-leash dog recreation area. There was also concern from some people about how the proposed project would affect dog policies in the County parks, with people wanting to maintain the existing policy of allowing people to walk dogs in those areas.
	Response: The issue of whether dogs would be allowed on Park Service-owned lands in the Project Area is clarified in Chapter 2 of the FEIS/EIR. To summarize, dogs would not be allowed in any areas where they are not currently allowed. This would include all of the restored wetland and grassland areas that are not designated trails. It would also include the Eastern Perimeter through-trail and spur trails included under Alternatives A-C, because these areas have not been open to the public. Dogs are also currently not allowed on the Tomales Bay Trail. Under the No Action Alternative and Alternative A, dogs would not be allowed on the north levee of the West

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Pasture, because of the trail's proximity to habitat for federally and state listed California clapper rail (*Rallus longirostris obsoletus*; FE, SE) and California black rail (*Laterallus jamaicensis coturniculus*; ST). Because the Southern Perimeter spur trail is connected to the Green Bridge County park, which allows dogs, dog use would continue to be allowed on the Southern Perimeter through- and spur-trail components. All dogs would be required to be on a 6-foot leash at all times (36CFR 2.15 (a) 2), and owners would be subject to fines for off-leash dogs. However, if at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the area could be closed to dog walking altogether through the Superintendent's Compendium process (36CFR 2.15 (a) 1). In general, dogs would continue to be allowed in County park areas subject to current and future county policies.
Public Access - East	
C-96	***Concern Statement (There Should Be No Trails or Parking Areas on Eastern Perimeter)***: Many commenters felt that no public access should be constructed on at least the southern portions of the eastern perimeter of the Project Area. Most of these comments focused on the Mesa Road spur trail and parking area, because these were the primary components included in the preferred alternative, although most applied to construction of any trail on the railroad grade. Commenters indicted that they believed that public access facilities would significantly alter the quality of life for Point Reyes Mesa residents by increasing noise, traffic congestion on Mesa Road, threats to public safety on Mesa Road, and the potential for vandalism, arson, brawls, human waste, and fire and that these factors could lead to decreases in local property values. Others felt that the facilities would degrade natural systems and wildlife habitat, including riparian habitat (See Impact Analysis section). Some commenters questioned the value of having public access facilities in this area, because there would be no through-trail (at least in Alternatives C and D), and few people would use the trail, making the costs higher than the benefits offered.
	Response: The agencies included a trail on the eastern perimeter, because considerable interest has been expressed in having public access on the historic railroad grade both prior to initiation of and during scoping for the proposed project. As with other components, the agencies attempted to create a range of actions on the eastern perimeter from a through-trail with a small parking lot and two viewing areas under Alternatives A and B to a simple spur trail and viewing area the Tomales Bay Trail under Alternative D. The agencies believe that the potential impacts of incorporating public access on the eastern perimeter of the Giacomini Ranch raised by commenters have been, for the most part, adequately addressed in the DEIS/EIR under a variety of resource topics, including Air Resources-Noise, Public Services-Traffic and Transportation, Vegetation Resources, and Fish and Wildlife Resources. Additional information regarding public safety has been added to the FEIS/EIR under Visitor and Resident Experience – Public Access Resources. Construction of public access features such as trailheads would be expected to have no more than a minor adverse impact under Alternatives A and B – and negligible impacts under Alternatives C and D -- on public safety in this area relative to existing conditions. The project planning team felt that spur trails would still offer public access benefits, even if fewer people used the trail.
C-97	***Concern Statement (There Should Be Trails on Eastern Perimeter)***: In contrast to C-96, several commenters supported creation of a trail on the eastern perimeter of the Project Area. Some supported the idea that this trail could be linked in the future to other portions of the historic railroad grade, providing a much more complete public access system. Another felt that the trail should be unimproved and for foot traffic only. One commenter requested that the agencies evaluate combining a through-trail public access option with full restoration of the rest of the Project Area and indicated that the benefits of such an option were not adequately discussed in the EIS/EIR, including potential benefits to public safety of the through-trail. Also, the discussion was inadequate was because the document did not cite any authors or experts that supported creation of a trail on the railroad grade.
	Response: The agencies believe that the benefits of having a through-trail are adequately addressed in the DEIS/EIR under Visitor and Resident Experience – Public Access Resources and under Public Services – Traffic and Transportation/Alternative Transportation. As discussed under

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	CS-96, the agencies attempted to create a range of actions on the eastern perimeter and did examine a through-trail option, as well, under Alternatives A and B. The planning team did not incorporate an eastern perimeter through-trail option with full or extensive restoration of the Giacomini Ranch and Olema Marsh under Alternatives C and D, because it was felt that this element was incompatible with full or extensive restoration. It would involve both permanent and temporary removal of riparian vegetation, would permanently impact wetlands that are subject to the jurisdiction of the U.S. Army Corps of Engineers, and would negatively affect both directly and indirectly important wildlife habitat for special status species such as the federally endangered tidewater goby (*Eucyclogobius newberryi*), the federally endangered central California coast coho salmon (*Oncorhynchus kisutch*), the federally threatened central California coastal steelhead (*Oncorhynchus mykiss*), and the state and regional federal species of special concern saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*). In addition, it could potentially violate the Streamside Conservation Act policies of the Local Coastal Plan (LCP; Marin County Comprehensive Planning Department 1981) and the Point Reyes Mesa buffer protection policies of the LCP and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001). Likewise, the planning team was concerned that creating an unimproved trail would only result eventually in larger impacts to the resources through unofficial widening of the trail. Obviously, larger benefits to alternative transportation would come from a longer through-trail option that would link to other portions of the historic railroad grade. These portions of the railroad grade are outside of the scope of the Project Area and the proposed project. The Park Service has explored in the past the potential for purchasing other lands that incorporate the historic railroad grade, but were unable to reach agreement with the owners. The through-trail under Alternatives A and B was intended to serve walkers, bikers, and equestrians, although, because of the resource values in this area and the fact that it has not been previously open to dogs, dog-walking would not be allowed.
C-98	If the Park Service constructs a trail and parking area on the eastern border of the property, they should construct a sidewalk along Mesa Road to protect non-vehicular traffic.
	Response: Because of the community's interest in preserving the rural character of the local communities, the agencies have attempted to avoid creating new paved areas for trails, parking, or sidewalks. Mesa Road offers very little opportunity for creation of a sidewalk due to the presence of wetlands, riparian habitats, streams, and the proximity of private property lines and fences to the road or lack of road shoulder in many areas. One of the reasons that the agencies included a small gravel parking lot at the trailhead for the Eastern Perimeter facilities was to specifically not encourage walking along Mesa Road, which currently has very little shoulder available for placement of a formal sidewalk or even unpaved footpath. Under Alternative D, there are no public access facilities off Mesa Road under Alternative D. Under Alternative C, it is unlikely that the Mesa Road spur trail would create enough foot and bike traffic between downtown Point Reyes Station and the trailhead to create a safety problem and warrant inclusion of a formal, paved sidewalk. However, under Alternatives A and B, the through-trail facilities could increase foot and bike traffic from the downtown area of Point Reyes Station. However, impacts to public safety would be considered no more than minor adverse relative to existing conditions. Should these alternatives be implemented, the Park Service may install signage at the trailhead to warn trail users that those walking along Mesa Road do so at their own risk.
C-99	***Concern Statement (Better Town Access to Martinelli Ranch)***: One commenting organization suggested that the park try to find better town access to the Martinelli Ranch by securing an access easement from one of the property owners on the south boundary and/or constructing a gate at the southeast corner.
	Response: The Park Service would be potentially interested in pursuing this in the future.
Public Access - South	
C-100	The DEIS/EIR identified a southern perimeter trail from a proposed bridge across Lagunitas Creek to White House Pool park. No specifics were provided on the exact alignment and whether the pathway is supposed to be inside or outside of the county right-of-way. Please provide details in the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	environmental document.
	Response: The agencies included graphics in the DEIS/EIR (Figure 7, 12, and 15) that shows the alignment of the Southern Perimeter Trail proposed under Alternatives A-C. This graphic illustrates the proposed alignment and shows that the pathway does not fall within the right-of-way for any County of Marin roads. The document also discusses a programmatic component that would potentially extend the Southern Perimeter Trail from White House Pool County park to Inverness Park in a collaborative project with the County of Marin (Figures 7, 12, and 15). This component would potentially fall within a County right-of-way for Sir Francis Drake Boulevard. Because this extension is being discussed in this document only as a possible future extension of the proposed trail, it is treated more generally or programmatically, because the decision on whether or how to proceed is not yet "ripe for decision." Specific alignments and other design details would be decided with the help of future technical study and design and additional environmental analysis and public input through a future NEPA and CEQA process.
C-101	***Concern Statement (Support for and Suggested General Modifications to Southern Perimeter Trail System)***: Several people expressed support for the Southern Perimeter Trail, stating that it would not unacceptably degrade natural resources and that the agencies should provide safe alternatives for non-vehicular traffic between Inverness Park and Point Reyes Station. Several other commenting individuals and agencies had suggested modifications to the proposed through-trail, including: 1) constructing the trail as a Class I pathway and paving it; 2) not creating a trail for weekend bicycle riders; 3) creating public access at Olema Marsh; 4) constructing a sidewalk along C Street to connect the Project Area to Highway 1; and 5) maintaining a bridge near White House Pool County park parking lot as part of the trail system.
	Response: ***1 and 2)*** During public access workshops conducted in 2005, members of the local community and general public expressed a strong preference for not creating paved paths within the Project Area. The belief was that paved paths would alter the rural character or nature of the local communities. Without paving, public access facilities would be unlikely to attract road cyclists, which is discussed in the DEIS/EIR. ***3)*** The agencies have discussed connecting the southern perimeter trail system proposed under Alternatives A-C with the Olema Marsh trail with a crosswalk across Levee Road, however, this would require further traffic analysis and consultation with and approval by the County of Marin Department of Public Works before it could be implemented. ***4)*** As noted under C-88, the agencies have attempted to minimize the amount of paved infrastructure constructed as part of the proposed project. Connection of C Street with State Route 1 would actually require sidewalks to be constructed along 3rd Street and B Street. Under Alternatives A and B, C Street would be connected to State Route 1 through the Green Bridge County park. C Street access would be eliminated under Alternatives C-D, which would negate the need for a sidewalk under these alternatives. ***5)*** There would be no plans to alter or remove this bridge under any of the alternatives.
C-102	***Concern Statement (Southern Perimeter and Access from C or B Streets)***: Several commenting individuals and agencies suggested that the Southern Perimeter Trail should include access from C Street in all alternatives, not just in Alternatives A and B. Several trailhead locations were suggested, including the trailhead at 3rd Street as well as one at Fourth Street. Conversely, other commenters noted that the agencies should avoid maintaining a trailhead at 3rd Street, because it would unacceptably increase the amount of vehicle traffic and create parking problems. At least one commenter suggested that the agencies explore the potential of creating a parking lot and trailhead at the corner of B Street and Highway 1 to avoid increases in traffic and parking problems on 3rd Street.
	Response: The existing trailhead for the informal trail on the Giacomini Ranch's East Pasture levee is located at Third and C Streets. As noted under C-93, strenuous objections by adjacent residents to the continued presence of a trailhead in the vicinity of Third and C Street pushed the planning team to incorporate a new Point Reyes Station trailhead at the Green Bridge and State Route 1 under Alternatives C and D. The northernmost parcels along C Street are in private

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	ownership (Giacomini family), and, should the land exchange move forward, most of the remaining parcels directly adjacent to C Street would also be in private ownership. The Giacominis were not interested in granting an easement to the Park Service. The Park Service has approached the trustees for the lands at the corner of B Street and State Route 1, however, there are no ongoing negotiations at the time the FEIS/EIR was prepared. The Park Service would pursue this option should the trustees express interest in the future.
C-103	***Concern Statement (Southern Perimeter Trail and Replacement of Bridge with Levee Road and Existing Green Bridge)***: Several individual and organization commenters suggested that the Southern Perimeter Trail be routed along Levee Road and the existing Green Bridge rather than constructing a new bridge at the old summer dam location. One person commented that the bridge was not necessary, because bicycling on Levee Road is safe. Others felt that access along Levee Road could be improved by either creating a bike lane in the existing road footprint or widening Levee Road, potentially on the southern side, and that widening would increase public safety. Some of the commenting organizations disagreed with statements in the DEIS/EIR that this alignment is infeasible because of concerns regarding public safety and impacts to landowners from noise and traffic, with at least one noting that this section of road would with certainty be improved at some point in the future by the County of Marin regardless of landowner concerns. Conversely, some commenters expressed concern about use of Levee Road for public access, saying that there should be no new public access along this road because it is -- and would continue to be -- too dangerous for pedestrians and bicyclists and that only the bridge trail would provide enough safety. One commenting organization stressed the need for the County of Marin and the Park Service to enter into a Memorandum of Understanding to plan, site, and fund public access facilities in this portion of the Project Area together rather than separately.
	Response: The agencies had originally considered inclusion of the Southern Perimeter Trail via Levee Road and the Green Bridge as part of Alternative D during development of its preliminary public access components. However, strong objections were voiced during the alternative and public access workshops (and reportedly during the public meetings for the West Marin Pathway study) from adjacent landowners regarding traffic and noise and from the general public regarding concerns for safety of pedestrians and bicyclists due to the speed and proximity of motor vehicles. Based on these concerns, the agencies eliminated this component from Alternative D, as is discussed in Chapter 2 of the DEIS/EIR under Alternatives Eliminated. Public opinion then changed during the comment period for the DEIS/EIR, with many local community members voicing a preference for having access along Levee Road rather than along the south bank of the East Pasture and across Lagunitas Creek. Several residents of Levee Road submitted a letter in support of having access along Levee Road. As noted in the response to C-91 above, the agencies believe that, based on the change in public opinion and the comments from local agencies, that the southern perimeter trail system is not "ripe for decision" by NEPA standards, despite years of study and meetings with agencies and the public. Further planning is apparently needed before this component can be fully implemented with support from the affected public. The agencies are committed to working with the appropriate agencies on expanding public access facilities on the southern perimeter of the Project Area. This cooperative project would better enabling better planning of viewing areas and maintenance responsibilities. Based on recent public input, this trail system should first re-explore the feasibility of siting a trail along Levee Road to the Green Bridge, where it could connect to the enhanced Green Bridge County park trail entrance proposed under Alternatives C-D. It could also include the extension to Inverness Park discussed programmatically in the DEIS/EIR. Because this path would be entirely within the County right-of-way, it would be appropriate for the County to take the lead. The Park Service would commit to working with the County: 1) on portions where the trail enters or abuts Park Service lands and 2) on raising the necessary funding. Another option would be to construct a bridge at the location of the old summer dam as is proposed currently under Alternatives A-C. However, should any of these options be chosen, a new environmental document would be required, as this component is only addressed programmatically under Alternative D.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
C-104	***Concern Statement (Clarification and Suggestions on Programmatic Component)***: One commenting agency requested clarification on the programmatic portion of the public access component in which the southern perimeter trail would be potentially extended to Inverness Park in the future through a collaborative project with the County of Marin. The agency requested more details on this portion, including whether or not another environmental document would be required before implementation. Another commenting agency suggested that the agencies include a fully accessible, raised viewing platform at White House Pool County park as part of the southern perimeter trail.
	Response: Under Alternatives A-C, the DEIS/EIR incorporates a programmatic component for potential future extension of the southern perimeter trail to Inverness Park through a collaborative project with the County of Marin. This component is included in this document, because it is a possible future action, however, there remain a number of factors that need to be addressed before a decision on whether or how to go forward can be made. These factors include resolving the problem of severe erosion of the creek bank adjacent to Sir Francis Drake Boulevard at White House Pool. The DEIS/EIR notes that this extension would follow one of two possible alignments – construction of a path on the road shoulder of Sir Francis Drake Boulevard all the way from White House Pool to Inverness Park or using a portion of the shoulder with the other portion being routed on a low-elevation boardwalk in the West Pasture (Figures 7, 12, and 15 in the DEIS/EIR). Included in this component is a proposal to construct an ADA-accessible viewing area in the future at White House Pool County park under Alternatives A-C. Because this element is only being addressed programmatically, there are no specific details on exact alignments, construction approaches, or conceptual cross-sections included. These details would be included in a subsequent environmental document.
C-105	***Concern Statement (Suggestions to County Parks on Maintenance and Operation)***: One commenting organization made several suggestions to the County of Marin Parks and Open Space District with regards to management of its White House Pool and Green Bridge County parks, including: 1) use the same type of trail surfacing materials as being considered by the agencies; 2) designate official trails either vegetatively or with split-rail fencing as proposed by agencies; and 3) restore remaining social trails.
	Response: The agencies cannot address comments or suggestions to other agencies.
C-106	The DEIS/EIR identifies a crosswalk along Sir Francis Drake Boulevard to connect the bridge crossing to Bear Valley Creek trail. It does not provide details on whether crosswalk is warranted nor analyzed any traffic or pedestrian hazards from such a crosswalk. Prior to construction of such a crosswalk, additional traffic and safety analysis would need to be provided to the County.
	Response: At this time, the proposed crosswalk has been removed from the document. Based on a safety analysis by DMJM/Korve, a crosswalk is not warranted, given the current number of trail users and the projected number of trail users under each of the alternatives (DMJM/Korve 2007). Should a crosswalk be considered necessary in the future, additional traffic and safety analysis would be performed and provided to the County of Marin Department of Public Works.
Construction	
C-107	Construction methods, traffic control, and accessibility compliance are not completely described in the document and will be required with the encroachment permit application. Provide information on proposed traffic control measures, and indicate if any lane closures are desired.
	Response: Construction methods are described in Chapter 2 of the DEIS/EIR. Additional details, including details regarding traffic delays and road closures that were discussed in other sections of the DEIS/EIR (Public Services – Traffic and Transportation), have also been incorporated into Chapter 2 of the FEIS/EIR. Traffic control measures would be developed more fully during the final design phase of the proposed project, and information on proposed traffic control, road closures, and accessibility compliance would be provided on the encroachment permit submitted to the County.
C-108	***Concern Statement (Construction Traffic and Routing)***: One commenting agency asked for

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	clarification on whether construction would generate traffic on public roads from import or export of construction and fill materials and which streets would be used as construction routes, particularly those in Point Reyes Station. One commenter requested that all truck traffic be routed onto the ranch road near the Giacomini Hunt Lodge rather than on 3rd Street in Point Reyes Station.
	Response: As was discussed in the DEIS/EIR under Public Services – Traffic and Transportation, the proposed project would generate traffic on public roads from trailoring of construction equipment, commuting of construction personnel, and hauling of excavated sediments and other non-soil materials to disposal areas. These impacts are discussed in Chapter 4. Construction routes in Point Reyes Station, Inverness Park, and on roads to the local disposal sites for excavated sediments are discussed both in Chapter 2 and Chapter 4. During construction of the East Pasture, it is anticipated that most of the hauling would be conducted using the ranch road near the Giacomini Hunt Lodge, but construction activities near the southern bank of the East Pasture and demolition of barns would probably generate truck traffic from the access point at Third and C Streets. To minimize noise, contractors would be asked to route trucks on streets that are primarily not residential such as Fourth Street rather than Third Street.
C-109	***Concern Statement (Construction Hours and Staging Areas)***: One commenter requested that construction activities near residences start no earlier than 8 a.m. and that construction staging areas be fenced to ensure public safety.
	Response: The agencies have responded to this comment by amending the construction start time in sensitive construction zones or construction areas directly adjacent to residences to 8 a.m. in the FEIS/EIR. Most construction staging areas would not be located in areas readily accessible to the public. Efforts would also be made to locate staging areas away from residential areas. Construction and construction staging areas would be posted with signage. In certain areas (near Inverness Park, near Giacomini Hunt Lodge, and near the Giacomini Ranch dairy facility), staging areas could be fenced with construction fencing that would deter access by the public, but this fencing would not completely eliminate the ability of the public, including children, to access construction areas.
C-110	***Concern Statement (Public Notification of Construction Schedules)***: A few commenters requested that the agencies provide or publish construction schedules so that local residents can better be apprised of project progress and better anticipate impacts from construction equipment.
	Response: A preliminary construction schedule would be mailed out to all people on the mailing list for the proposed project at least two (2) to four (4) weeks prior to implementation. As with all construction projects, this schedule would be subject to change depending on scheduling of construction activities, equipment availability, constraints imposed by mitigation measures, biological and special status species constraints, and other factors. An up-to-date schedule would be maintained on the Seashore's webpage for the Giacomini Wetland Restoration Project and would be amended on an as-needed basis.
C-111	***Concern Statement (Construction and Creation of Breeding Areas for Mosquitoes)***: One commenting agency stated that impoundment of water during construction should be avoided, because it will create breeding conditions for mosquitoes. It noted that surveillance of the construction area might be necessary in order to address any issues that arise.
	Response: As discussed in the DEIS/EIR, construction contractors may need to install coffer dams or other water types of water control structures in order to adequately dewater construction areas. These structures could impound water. They would be installed for the minimum amount of time necessary to complete the construction task, but they could provide even temporary breeding grounds for mosquitoes. As discussed under C-17, while mosquitoes are native and elements of natural systems, the Park Service is responsible for control efforts when these organisms pose a threat of a human health hazard as determined by the U.S. Public Health Service. Because stagnant water present during the mosquito breeding seasons could provide habitat for mosquitoes, including those documented to carry West Nile virus, mitigation will include monitoring of pooled water for mosquito larvae as well as the potential use of the mosquito larvicide, *Bacillus thuringensis*(Bti), a biological pesticide which specifically targets

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	mosquito larvae, is biodegradable and does not have measurable effects on other species.
C-112	During project construction, some existing public access trails should remain accessible and protected from construction traffic.
	Response: Some of the impacts to public access during construction would be alleviated by the fact that the restoration and public access components may not necessarily be constructed during the same years. During construction of the restoration component, only one existing public access trail would potentially be temporarily closed under Alternatives A-D – the informal existing path along the south bank of the East Pasture. The Olema Marsh trail would temporarily be closed during construction of Adaptive Restoration Component #1. Should Levee Road culverts eventually be replaced as part of the adaptive restoration of Olema Marsh, there would also be a temporary closure of the very eastern end of the White House Pool County park trail under Alternatives C-D. Under the No Action Alternative and Alternative A, the existing informal path on north levee would not be affected. When public access components are constructed, the informal path on the south bank of the East Pasture would be closed during construction of the Southern Perimeter through-trail and spur trail components. Under Alternatives C-D, the entrance to the Green Bridge County park would temporarily be closed to improve the trailhead entrance. Under Alternative D, some portion of the White House Pool County park trail system would be temporarily closed for construction of an ADA-compliant trail facility. In general, as discussed in Chapter 4 of the DEIS/EIR of Visitor and Resident Experience – Public Access Resources, impacts to existing public access during construction were characterized as no more than minor, but the effect of traffic delays and potential road closures and effects on other visitor resources in the Seashore's North District would potentially increase impacts to moderate under Alternatives C and D.
C-113	The USEPA recommends that some additional measures be included in the Spill Prevention and Response Plan, such as 1) a spill kit with boom and sorbent materials should be on site at all times during construction and 2) no vehicles will be fueled, lubricated, or otherwise serviced within 100 feet of the normal high-water area of any surface water body.
	Response: This recommendation has been incorporated into the Impact Avoidance and Mitigation Measures that would be implemented during construction for all alternatives in Chapter 2 of the FEIS/EIR.
Invasives	
C-114	The DEIS/R fails to disclose potential impacts from feral dogs and cats. The Project should mitigate adverse effects from these animals. These actions could include signage to discourage animal dumping and active trapping.
	Response: The agencies have addressed the potential impacts from feral dogs and cats in the FEIS/EIR under Fish and Wildlife Resources/Invasive Wildlife Species. To summarize, feral cats have a documented and adverse effect on birds, amphibians and small mammals in native ecosystems (Winter and Wallace 2006, Patronek 1998). Monitoring throughout the Seashore for impacts of feral cats and dogs is ongoing (N. Gates, wildlife biologist, Seashore, *pers. comm*.). However, there are no data to suggest that the Project Area will attract the release of unwanted dogs and cats any more than any other road-accessible area of the park. Release of pets on Park Service lands is illegal (36CFR 2.1 (a) 2). Should illegal dumping of pets become a serious issue, signage informing the public of these regulations will be posted. Should impacts in the project area be detected, removal of feral animals will be implemented as mandated by Park Service Management Policies (Section 4.4.2.1).
C-115	***Concern Statement (Removal of Eucalyptus from Tomasini Creek and Adjacent Private Lands)***: Several commenters felt that the Park Service should support a federal/private cooperative to expedite removal of eucalyptus trees from Tomasini Creek and the surrounding privately owned portions of the Point Reyes Mesa bluff. Commenters felt that this partnership would be beneficial, because the trees could be felled across property boundaries; trees could be hauled away on existing ranch roads within the Project Area, reducing impacts to residents; and the cooperative parties could work together to control resprouting trees and implement revegetation. They note that there is

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	support for removal of these trees in the Seashore's Exotic Management Plan, as well as the Local Coastal Plan and the Point Reyes Community Plan. They believe that removal would benefit natural hydrological and ecological processes and conditions, including conditions for the federally threatened tidewater goby, and viewsheds in the Project Area.
	Response: The Park Service agrees that there would be potential hydrologic and ecological benefits to removing the eucalyptus stands that have been planted on the Point Reyes Mesa bluff and would be interested in working cooperatively with private landowners in the future on removal of these stands as a separate project. The agencies have expanded invasive removal efforts to include the moderate number of eucalyptus trees that grow on the berm of Tomasini Creek as described in Chapter 2 of the DEIS/EIR under Actions Common to All Alternatives. Because the historic railroad grade no longer functions as a road, the feasibility of removing trees from the Giacomini Ranch-side of the Mesa is low under the No Action Alternative and Alternatives C-D and would be very difficult even with the tree clearing and eastern perimeter through-trail construction proposed under Alternatives A-B. Trees would have to be moved across Tomasini Creek to the East Pasture, and the ground surface in this area is extremely soft from long-term inundation such that it is likely that most appropriately sized trucks could become repeatedly mired in the mud. Removal of the relative few juvenile and adult eucalyptus trees growing on Tomasini Creek would be achieved by hauling out the cut-up material by foot to one of the north-south running ranch roads in this area.
Miscellaneous	
C-116	The Park Service should assume management of the California State Lands parcels immediately north of the Project Area in order to better integrate management of those lands with management of the Project Area.
	Response: This lease issue is beyond the scope of the proposed project. The Park Service is not currently pursuing a lease for these lands. However, depending on the interest of CSLC, the Park Service may be interested in pursuing a lease of these lands in the future.
C-117	***Sub-Topic (Hunting on Adjacent State Lands)***: A few commenters urged the Park Service work with other agencies to prohibit hunting on California State Lands Commission (CSLC) lands to the north of the Giacomini Ranch. One commenter suggested that the hunting area be shifted northwards towards Inverness or even as far as Walker Creek to provide a reasonable buffer.
	Response: This hunting issue is beyond the scope of the proposed project. However, in the future, the Park Service will discuss the issue with the California Department of Fish and Game (CDFG), which has management authority over this CSLC property.
C-118	The DEIS/R is inadequate because it does not provide estimated costs of the proposed alternatives and does not provide a cost/benefit analysis.
	Response: Inclusion of estimated costs and cost/benefit analysis is not a requirement of NEPA or CEQA. Reasonable alternatives" warranting detailed study are described in the President's Council on Environmental Quality (CEQ) guidance as "those that are practical or feasible from the technical and economic standpoint and using common sense." Costs and economic viability are considered along with other factors in determining the reasonableness of alternatives. However, they are not necessarily used as factors to evaluate the potential impacts of proposed projects on the "human environment." Impact topics chosen for evaluation are typically ones related to the physical and natural environment, although, under CEQA, social or socioeconomic topics are often incorporated, as well, if the proposed project would have some effect on the physical environment.
C-119	***Sub-Topic (Inclusion of Land Exchange in DEIS/EIR)***: Several commenters commented upon the proposed land exchange between the Park Service and the Giacomini family. One commenter felt that the DEIS/EIR was inadequate, because it did not address the proposed property exchange. Another commenter felt that all the agriculturally zoned property in the Project Area should be in public ownership and that all infrastructure should be removed. One person questioned how the acquisition of the parcels along Sir Francis Drake Boulevard would impact Alternatives C or D.
	Response: The proposed land exchange was addressed in the DEIS/EIR as a separate project

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	from the one proposed by the Park Service and CSLC and was listed in the table at the beginning of Chapter 4 that lists actions included in cumulative effects analysis. The project was titled Residential Home Development, C Street, even though a specific project has not been proposed, because the lands are zoned for residential development, and the reasonably foreseeable outcome of an exchange of Park Service C Street Lands for the remaining pastureland parcels still owned by the Giacominis is that homes would be developed along C Street. Inclusion of this reasonably foreseeable action in the cumulative effects analyses means that the potential impacts of each alternative (including Alternatives C and D) are considered in combination with those of the Residential Home Development for all of the impact topics addressed in the environmental document. To better clarify this in the FEIS/EIR, the proposed land exchange is now included as a separate project from Residential Home Development, C Street, and its cumulative impacts are analyzed separately from those of the reasonably foreseeable development of homes along C Street. Because of public comment, the Park Service and the Giacominis restructured the proposed land exchange agreement such that the Park Service would retain all agriculturally zoned parcels and tear down all of the buildings on Park Service lands proposed for exchange to the Giacomini family.
C-120	***Sub-Topic (Inclusion of Park Service Property in Exchange Project in Restoration Project)***: One commenter felt that the DEIS/EIR did not adequately explain why the Park Service property along C Street that is proposed for exchange for lands currently owned by the Giacomini family was excluded from the Giacomini purchase and why it was not considered integral to -- and included in -- the restoration project. This commenter felt that the Park Service should seek funding from a variety of federal and private funding sources to retain possession of the parcels west of C Street to be incorporated into the Project Area.
	Response: As discussed under C-1 and C-55, the Park Service's MOU with CalTrans calls for a restoration of a significant portion of the Giacomini Ranch. However, it does not call for restoration of the entire ranch. In the purchase and in developing the proposed project, the planning team focused its efforts on where it felt that the limited dollars available for purchase and restoration could yield the most ecological benefit. For the most part, these were areas in the low-lying pastures or former historic coastal marsh areas that are not directly adjacent to existing residential, commercial, and agricultural development and areas that have not been subject to intensive historic impacts such as repeated fill events that would require extensive excavation and rehabilitation before they could be considered "restored." For this reason, the agencies elected not to focus their restoration efforts on the dairy facility parcels along C Street in Point Reyes Station that have been subject to repeated fill activities, disturbance from dairy activities, and are directly adjacent to the town of Point Reyes Station, which would increase the likelihood of wildlife disturbance from people and domestic and feral animals. These were some of the reasons that the Park Service elected to enter discussions with the Giacomini family to exchange some of these parcels for low-lying pasturelands that were considered to have more existing ecological value as part of a separate project that is discussed in the DEIS/EIR under Cumulative Impacts in Chapter 4.
C-121	We would encourage the Park Service to continue to fund ongoing monitoring at a high level in order to track progress of the restoration actions and to allow for ongoing adaptations as needed.
	Response: The Park Service has developed a long-term monitoring program for the proposed project. As part of this monitoring project, the Park Service has been conducting pre-restoration monitoring to establish baseline conditions and is proposing to continue monitoring after restoration is completed. Monitoring would be conducted frequently during the first 5- to 7 years post-implementation to document what is expected to be a fairly rapid evolution of the managed pasturelands into natural wetlands shaped by natural hydrologic and ecological processes and functions. Between Year 7 and Year 20, monitoring is proposed for Year 10, Year 15, and Year 20 to document changes in processes and functions that are expected to take longer to evolve. Monies have been secured to fund at least the first few years of monitoring of changes in wildlife and water quality and other variables directly or indirectly related to hydrology such as invertebrates, algae, and sediment deposition, but additional funding would be needed to fund

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	other variables and the later years of monitoring.
C-122	Who is responsible for maintenance and law enforcement on any trails established within the Project Area?
	Response: The Park Service's Law Enforcement Division is responsible law enforcement on Park Service-owned lands within the Project Area, with backup, when needed, from the Marin County Sheriff's Office. Law enforcement on lands not owned by the Park Service would fall to the Marin County Sheriff's Office. Maintenance of trails on Park Service-owned lands would fall to the Park Service's Roads and Trails Division. Maintenance of trails that are not on Park Service-owned lands would fall either to the land owner or lessee: in the case of White House Pool and Green Bridge County parks, it would be the County of Marin Parks and Open Space District.
C-123	The Park Service should bury existing overhead utility lines between Point Reyes Station and Inverness Park.
	Response: The utility lines do not fall on Park Service lands. Most of the utility lines have been placed in the right-of-way for County of Marin roads. Burying of overhead power lines would be under the jurisdiction of the utility and the County of Marin.
C-124	Change the name of the site from "Waldo Giacomini Wetland" to "Tomales Bay Wetland."
	Response: As a condition of the purchase agreement with the Giacomini family, the Park Service agreed to name the restored wetland after Waldo Giacomini, the founder of the Giacomini Ranch dairy.
C-125	Disposal of dredged materials within PRNS may impact rare plants and introduce invasive plants. Mitigation measures should be implemented.
	Response: The Park Service is handling restoration of the quarries with imported materials as a separate project. It is listed in Chapter 4 as one of the Actions Included in the Cumulative Effects Analysis. Hauling of excavated sediments to the quarry is incorporated into this FEIS/EIR. The Seashore has prepared extensive maps showing the locations of rare plants with respect to the quarries and is in the process of refining the wetland delineations. Most of the potential impact would occur with hauling to the McClure DG quarry. The impact analysis for Vegetation Resources addresses potential impacts to wetlands and special status plant species, including proposed mitigation measures to either avoid or minimize those impacts. In terms of introducing invasive plants, the preliminary restoration plan involves disposal of imported materials at the bottom of the quarry, with grading of adjacent surface soils used to provide a "cover" or topsoil layer of sufficient depth to bury seeds and vegetative propagules of non-native invasive plant species and thereby preclude their establishment.
Permitting	
C-126	***Concern Statement (Additional Permits or Consultations That May Be Required)***: Several commenting agencies suggested that the agencies would need to seek additional permits or consultations other than those noted in the DEIS/EIR: These included: 1) consultation with Bay Area Air Quality Management District; 2) Gulf of the Farallones National Marine Sanctuary; 3) State National Pollution Discharge Elimination System (NPDES); 4) California Endangered Species Act; and 5) Lake and Streambed Alteration Agreement. The CESA would require CEQA documentation, including specified impacts, mitigation measures, and a mitigation and monitoring reporting program.
	Response: The agencies have incorporated the need for these permits or consultations into the planning process, as is now reflected in the revised Chapter 5 of the FEIS/EIR. A mitigation and monitoring program has been developed and included as an appendix in the FEIS/EIR.
C-127	The State Department of Conservation cannot concur with a finding that a conversion of the East and West Pastures to non-agricultural uses would be less than significant unless additional clarifying detail is provided. Also, the DEIS/EIR indicates that there may be additional acquisitions that would expand the Wildlife Area in the future, but does not elaborate. Any future acquisition would require additional environmental documentation, and we ask that we receive a copy of the documents for our review

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	and comment.
	Response: After further discussion with the State Department of Conservation officials, the agencies have incorporated a separate memorandum detailing the results of the LESA as an appendix in the FEIS/EIR. This appendix should provide the necessary information which the State Department of Conservation can use to conclude that the impacts to non-agricultural uses would be less than significant. There would be no further acquisitions as a part of the proposed project.
C-128	Does the Park Service have an estimated date for when California Coastal Commission consistency determination submittal will occur?
	Response: The Coastal Commission consistency determination submittal would occur concurrently with production of the FEIS/EIR.

Literature Cited and Index

Literature Cited

Aigner, P. A., J. Tecklin, et al. (1995). "Probable breeding population of the black rail in Yuba County, California." Western Birds **26**: 157-160.

Aitkin, J. K. (1998). The importance of estuarine habitats to anadromous salmonids of the Pacific Northwest: a literature review. Lacey, Washington, U.S. Fish and Wildlife Service.

Albertson, J. and J. Evens (2000). California Clapper Rail: Species Narrative. Baylands Ecosystem Species and Community Profiles, San Francisco Bay Estuary Habitat Goals Report.

Aldous, A., P. McCormick, et al. (2005). "Hydrologic regime controls soil phosphorus fluxes in restoration and undisturbed wetlands." Restoration Ecology **13**: 341-347.

Alta Transportation Consulting (2001). Marin County Unincorporated Area Bicycle and Pedestrian Master Plan, Prepared for Marin County Congestion Management Agency. Prepared by Alta Transportation Consulting.

AMCA (2005). Mosquito-Borne Diseases, American Mosquito Control Association Website: http://www.mosquito.org/mosquito-information/mosquito-borne.aspx.

American Water Works Association (AWWA) (1990). Water Quality and Treatment, McGraw-Hill, Inc.

Anderson Consulting Group (2000). Geotechnical peer review Point Reyes Affordable Housing Project. Sacramento, California, Prepared for Psomas.

Anima, R., J. L. Bick, et al. (1988). Sedimentologic Consequences of the Storm in Tomales Bay, in Landslides, Floods, and Marine Effects of the Storm of January 3-5, 1982 in the San Francisco Bay region, California. Menlo Park, California, U.S. Geological Survey Professional Paper 1434.

Anisfeld, S. C. and G. Benoit (1997). "Impacts of flow restriction on salt marshes: an instance of acidification." Environmental Science and Technology **31**: 1650-1657.

Arthur, J. A. and M. D. Ball (1979). Factors influencing the entrapment of suspended material in the San Francisco Bay-Delta Estuary. San Francisco Bay: the urbanized estuary. T. J. Conomos. San Francisco, California, Pacific Division, American Association for the Advancement of Science**:** 143-174.

Association of Bay Area Governments (ABAG) (2003). ABAG Earthquake Maps and Information, http://www.abag.ca.gov/bayarea/eqmaps/.

Avocet Research Associates (ARA) (2002). Giacomini Wetland Restoration Site: special status animal species - reconnaissance and compliance, Final report to Point Reyes National Seashore, National Park Service.

Ayres, D. R., D. Garcia-Rossi, et al. (1999). "Extent and degree of hybridization between exotic (Spartina alterniflora) and native (S.foliosa) cordgrass (Poaceae) in California, USA determined by random amplified polymorphic DNA (RAPDs)." Molecular Ecology **8**: 1179 –1186.

BAAQMD (1999). CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans. San Francisco, California, Bay Area Air Quality Management District.

BAAQMD (2003). Climate, Physiography, and Air Potential - Bay Area and its Subregions (Referenced by County), Bay Area Air Quality Management District, May 2000.

Barlow, M. A., M. N. Dawson, et al. (2001). Phylogeographic structure of the tidewater goby, *Eucyclogobius newberryi* (Teleostei, Goebiidae), in the San Francisco Bay area and Ventura County: Implications for conservation management [Abstract]. 82nd Annual Meeting, Western Society of Naturalists, Ventura, California.

Bass, R. E., A. I. Herson, et al. (2001). The Nepa Book: A Step-By-Step Guide on How to Comply With the National Environmental Policy Act. Point Arena, California, Solano Press.

Baye, P. R., P. M. Faber, et al. (2000). Tidal marsh plants of the San Francisco Estuary. Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, U.S. Environmental Protection Agency, San Francisco, CA and San Francisco Bay Regional Water Quality Control Board, Oakland, California.

Bayer, R. D. (1980). "Birds Feeding on herring eggs in the Yaquina Estuary, Oregon." Condor **82**: 193-198.

BCDC (2001). Public Access and Wildlife Compatibility. Bay Conservation and Development Commission. San Francisco, California.

Behrendt, H. (1996). "Inventories of point and diffuse sources and estimated nutrient loads - A comparison for different river basins in Central Europe." Water, Science and Technology **33**(4-5): 99-107.

Bell, D. A. (1994). "Peregrine Falcons Seek High-Rise Habitat." California Wild: http://www.calacademy.org/calwild/1994spring/stories/falcons.htm.

Bell, G. B. (1958). The Uses of Meterological Data in Large Scale Air Pollution Surveys. Menlo Park, California, Stanford Research Institute.

Biocontrol News and Information (1999). Barnacle May Fit the Bill, March 1999, Volume 20 No. 1. CABI Publishing.

Blunt, C. E. (1980). Atlas of California coastal marine resources. Sacramento, California, California Department of Fish and Game**:** 134.

Bradley, C. E. and D. G. Smith. (1986). "Plains cottonwood recruitment and survival on a prairie meandering river floodplain, Milk River, southern Alberta and northern Montana." Canadian Journal of Botany **64**: 1433-1442.

Bratovich, P. M. and D. W. Kelley (1988). Investigations of salmon and steelhead in Lagunitas Creek, Marin County, California, Volume I: migration, spawning, embryo incubation and emergence, juvennile rearing, emigration, A report prepared for Marin Municipal Water District by D.W. Kelley and Associates, Newcastle, California.

Bratovich, P. M., H. Rooks, et al. (1984). Water Year 1982-83 investigations on Lagunitas Creek, Marin County, California: second progress report. Newcastle, California, A report prepared for Marin Municipal Water District by D.W. Kelley and Associates.

Briggs, K. T., W. B. Tyler, et al. (1987). Bird communities at sea of California: 1975-1983. Studies on Avian Biology, 11.

Brinson, M. M. (1993). A Hydrogeomorphic Classification for Wetlands. August 1993 - Final Report, Wetlands Research Program Technical Report WRP-DE-4.

Brown, L. R., P. B. Moyle, et al. (1994). "Historical Decline and Current Status of Coho Salmon in California." North American Journal of Fisheries Management. **14**(2): 237-261.

Brown, W. M., III (1988). Historical setting of the storm: Perspectives on population, development, and damaging rainstorms in the San Francisco Bay region. Landslides, floods, and marine effects of the storm of January 3-5, 1982, in the San Francisco Bay region, California. S. D. Ellen, and Wieczorek, G.F, U.S. Geological Survey Professional Paper 1434**:** 7-15.

BRW and Lee Engineering (1998). Point Reyes National Seashore Transportation Study., Prepared for Point Reyes National Seashore.

Busby, M. S. and R. A. Barnhart (1995). "Potential Food Sources and Feeding Ecology of Juvenile Salmon in California's Mattole River Lagoon." Calif. Fish and Game **81**(4): 133-146.

Calflora (2006). Information on California plants for education, research and conservation. [web application]. Berkeley, California, The Calflora Database [a non-profit organization]. http://www.calflora.org/.

California Department of Conservation (2002). Letter, March 28, 2002. National Park Service - Point Reyes National Seashore.

California Department of Conservation (2004). Important Farmland map of Marin County. Sacramento, California, California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program.

California Department of Conservation (2006). Farmland Mapping and Monitoring Program, California Department of Conservation, Division of Land Resource Protection. http://www.consrv.ca.gov/DLRP/fmmp/index.htm.

California Department of Finance (2006). E1: City/County Population Estimates with Annual Percent Change: January 1, 2005 and 2006, California Department of Finance: http://www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E1/E-1text.asp.

California Department of Health Services (DHS) (1996). Identification of Sources of Bacterial Indicators of Waters of Tomales Bay Shellfish Beds, Pilot Monitoring Progra,, Winter 1994-95, California Department of Health Services, Environmental Microbial Diseases Laboratory.

California Department of Transportation (1999). Caltrans Standard Specifications. Sacramento, CA, State of California.

California Geological Survey (2002). Note 49: Guidelines for Evaluating the Hazard of Surface Fault Rupture, California Department of Conservation, California Geological Survey: http://www.consrv.ca.gov/CGS/information/publications/.

California Geological Survey (2006). Alquist-Priolo Earthquake Fault Zones, California Department of Conservation. http://www.consrv.ca.gov/CGS/rghm/ap/index.htm.

Calilfornia Geological Survey (2004). Seismic Hazard Mapping Bulletins. Natural Hazards Disclosure: Seismic Hazards Zones, http://gmw.consrv.ca.gov/shmp/SHMPrealdis.htm#In_Zone.

Caltrans (1996). Guidelines for the Official Designation of State Scenic Highways, California Department of Transportation. http://www.dot.ca.gov/hq/LandArch/scenic/shpg1.htm#top.

CDFG (2001). California's Living Marine Resources: a status report., California Department of Fish and Game. ANR Publication #SG01-11.

CDFG (2005). California Natural Diversity Database, California Department of Fish and Game. 2002,2003,2005.

CDFG (2006). The Natural Community Conservation Planning (NCCP), California Department of Fish and Game. http://www.dfg.ca.gov/nccp/index.html.

CH2M Hill (1990). DRAFT: South Bay Dye Study (Provision E5D). San Jose, CA, Prepared for the City of San Jose Department of Water Pollution Control.

Chambers, R. M. (2000). Tomales Bay - LMER/BRIE Studies 1987-1995. Fourth State of Tomales Bay Conference, Inverness Yacht Club.

Chambers, R. M., J. W. Fourqurean, et al. (1995). "Importance of terrestrially-derived particulate phosphorus to phosphorus dynamics in a West Coast estuary." Estuaries **18**: 518-526.

Chambers, R. M., J. T. Hollibaugh, et al. (1994). "Sulfate reduction and sediment metabolism in Tomales Bay, California." Biogeochemistry **25**: 1-18.

City of Sebastopol (2005). Laguna de Santa Rosa., Laguna Wetlands preserve website. http://www.ci.sebastopol.ca.us/lagunawetlandspreserve.shtml.

Clark, J. C. and E. E. Brabb (1997). Geology of the Point Reyes National Seashore and vicinity, Marin County, California: a digital database, U.S. Geological Survey Open-File Report**:** 97-456.

Clearwater Hydrology and Nichols-Berman (2002). Marin Countywide Plan: Flooding Technical Background Report. Chico and Benicia, California, Prepared for the Marin County Community Development Agency, San Rafael, California.

CNPS (2005). Inventory of Rare and Endangered Plants (online edition). Sacramento, California, California Native Plant Society. http://www.cnps.org/inventory.

CNPS (2006). Policy on Invasive Exotic Plants, Adopted 1999, California Native Plant Society. http://www.cnps.org/archives/exotics.htm.

Cohen, A. N. and J. T. Carlton (1995). Nonindigenous Aquatic Species in a United States Estuary: A Case Study of the Biological Invasions of the San Francisco Bay and Delta., Report to the U.S. Fish and Wildlife Service and the National Sea Grant College Program, Connecticut**:** 262.

Cohen, N. W. and W. E. Howard (1958). "Bullfrog food and growth at the San Joaquin Experimental Range, California." Copeia 1958: 223-225.

Cole, B. E. (1989). "Temporal and spatial patterns of phytoplankton production in Tomales Bay, California." Estuarine, Coastal and Shelf Science **28**: 103-115.

Cole, B. E., S. W. Hager, et al. (1990). Hydrographic, biological, and nutrient properties of Tomales Bay, California, March 1985 to May 1986. Menlo Park, California.

Collins, J. N. and V. H. Resh (1989). Guidelines for the ecological control of mosquitoes in non-tidal wetlands of the San Francisco Bay Region, Special Publication of the California Mosquito and Vector Control Association**:** 93.

Collins, J. N., E. Stein, et al. (2003). Draft California Rapid Assessment Method (CRAM) for Wetlands, v 1.7, San Francisco Estuary Institute and Southern California Coastal Water Research Project.

Collins, J. N., E. Stein, et al. (2004). Draft California Rapid Assessment Method (CRAM) for Wetlands, v 3.0: User's Manual and Scoring Forms, San Francisco Estuary Institute and Southern California Coastal Water Research Project.

Columbia River Estuary Turbidity Maxima (CRETM) (2001). Land-Margin Ecosystem Research (LMER) Project, http://depts.washington.edu/cretmweb/CRETM.html.

Cook, S. F. (1976). The Population of the California Indians, 1769-1970. Berkeley, California, University of California Press.

Cooper, A. W. (1974). Salt Marshes. Coastal Ecological Systems of the United States. H. T. Odum, B. J. Copeland and E. A. McMahan. Washington, D.C., Conservation Foundation. **2:** 55-96.

Corliss, J. (1993). "Tall whitetop's crowding out the natives." Agriculture Research **16**.

Council on Enviromental Quality (1981). Memorandum for General Counsels, NEPA Liaisons and Participants in Scoping. Washington, D.C., Executive Office of the President.

Council on Environmental Quality (1997). The National Environmental Policy Act: A Study of Its Effectiveness After Twenty-five Years. Council on Environmental Quality. Washington, D.C.

Cowardin, L. M., V. Carter, et al. (1979). Classification of Wetlands and Deepwater Habitats of the United States. Washington, D.C., U.S. Department of the Interior, Fish and Wildlife Service, FWS/OBS-79/31.

Dahl, T. E. (1990). Wetlands losses in the United States 1780's to 1980's. Washington, D.C., U.S. Department of the Interior, Fish and Wildlife Service**:** 13.

Dale, R. H. and S. E. Rantz (1966). Hydrologic reconnaissance of Point Reyes National Seashore area, California, U.S. Geological Survey Open-File Report.

Dalia, W. (1998). Mosquito Control (Historical Methods), Conservation New England. http://site.www.umb.edu/conne/wendy/Mosquito.html.

Davis, J. A., D. Yee, et al. (2003). "Issues in San Francisco Estuary Tidal Wetlands Restoration: Potential for Increased Mercury Accumulation in the Estuary Food Web." San Francisco Estuary and Watershed Science **1**(1): Article 4. http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art4.

Dawson, M. N., K. D. Louie, et al. (2002). "Comparative phylogeography of sympatric sister species, *Clevelandia ios* and *Eucyclogobius newberryi* (Teleostei, Gobiidae),across the California Transition Zone." Molecular Ecology **11**: 1065-1075.

Dawson, M. N., J. L. Stanton, et al. (2001). "Phylogeography of the tidewater goby (*Eucyclogobius newberryi*; Teleostei, Gobiidae) in coastal California." Evolution **55**(6): 1167-1179.

De Witt, M. (1999). Nutrient fluxes in the Rhine and Elbe Basins, PhD Thesis. Faculteit Ruimtelijke. Utrecht, Netherlands, Wetenschappen Universiteit**:** 162.

DeLaune, R. D., S. R. Pezeshki, et al. (1987). "Response of coastal plants to increase in

submergence and salinity." Journal of Coastal Research **3**: 535–546.

DeLaune, R. D. and C. J. Smith (1985). "Release of nutrients and metals following oxidation of freshwater and saline sediment." Journal of Environmental Quality **14**(2): 164-168.

Dennis, N. B. and M. L. Marcus (1984). Status and trends of California wetlands, Final report prepared for the California Assembly, Resources Subcommittee.

Depczynski, J., R. C. Franklin, et al. (2002). Farm Noise Hazards: Noise Emissions during Common Agricultural Activities. Moree, Australia, Rural Industries Research and Development Corporation and Australian Centre for Agricultural Health and Safety.

DHS (2006a). West Nile Virus in California, California Department of Health Services, California Department of Food and Agriculture, Mosquito and Vector Control Association of California, California Vectorborne Disease Surveillance System: http://www.westnile.ca.gov/.

DHS (2006b). Maximum Contaminant Levels and Regulation Dates for Drinking Water Contaminants: USEPS vs. CDHS. California Department of Health Services, Sacramento, California.

DKS Associates (2001). Traffic Report for the Point Reyes Affordable Housing Project, Prepared for EDAW.

Downing, T. (2001). Keeping Track of Manure Nutrients in Dairy Pastures. Corvallis, Oregon, Oregon State University, PNW 549.

DMJM Harris/Korve (2007). Giacomini Wetland Restoration Project - Safety Assessment and Analysis. Prepared for Point Reyes National Seashore. Point Reyes Station, Calif. Oakland, Calif.

Dunne, T. and L. B. Leopold (1978). Water in Environmental Planning. New York, New York, W.H. Freeman and Company.

EDAW Inc. (2001). Final Environmental Impact Report for the Point Reyes Affordable Housing Project. November 29, 2001. Prepared for the County of Marin.

Egan, D. M. (1972). Concepts in Architectural Acoustics. New York, New York, McGraw-Hill.

Ellen, S. D., G. F. Wieczorek, et al. (1988). Introdution - Landslides, floods, and marine effects of the storms of January 3-5, 1982, in the San Francisco Bay region. In: , eds: Ellen, S.D. and Wieczoreck, G.F., . Landslides, floods, and marine effects of the storm of January 3-5, 1982, in the San Francisco Bay Region, California. S. D. Ellen and G. F. Wieczorek, U.S. Geological Survey Professional Paper 1434.

Emberson, G., S. Thalman, et al. (1999). Point Reyes National Seashore Cultural Affiliation Report. Novato, CA, Submitted by the Federated Coast Miwok Cultural Preservation Association. NPS Cooperative Agreement No. 1443-CA-8530-97-017.

Evans, W. A. (1990). Summary of Fish Passage Conditions, Bear Valley Creek, Prepared by Evans Environmental Consultants, November 30**:** 10.

Evens, J. (1993). The Natural History of the Point Reyes Penninsula. Point Reyes Station, California, Point Reyes National Seashore Association.

Evens, J. and G. W. Page (1986). "Predation on black rails during high tides in salt marshes." The Condor **88**: 107-109.

Evens, J., G. W. Page, et al. (1991). "Distribution, relative abundance and status of the California black rail in western North America." The Condor **93**: 952-966.

Evens, J. G. and N. Nur (2002). "Black Rails in the San Francisco Bay Region: spatial and temporal variation in distribution and abundance." Bird Populations **6**: 1-12.

Evens, J. G., G. W. Page, et al. (1989). Distribution and relative abundance of the California Black Rail (*Laterallus jamaicensis coturniculus*) intidal marshes of the San Francisco Bay estuary., Report to California Department of Fish and Game.

Evens, J. G. and R. W. Stallcup (1991). "Coastal Riparian Marsh." Breeding Bird Census **62**(1): 75-76.

Evens, J. G. and R. W. Stallcup (1992). "Coastal Riparian Marsh." Breeding Bird Census **63**(1): 95-96.

Evens, J. G. and R. W. Stallcup (1993). "Coastal Riparian Marsh." Breeding Bird Census **64**(1): 91-92.

Evens, J. G. and R. W. Stallcup (1994). "Coastal Riparian Marsh." Breeding Bird Census **65**(2): 105-106.

Federal Highway Administration (1982). Report of Field Review - Highway Traffic Noise Impact Identification and Mitigation Decisionmaking Processes, Office of Environmental Policy.

Federal Highway Administration (1983). Visual Impact Assessment for Highway Projects. Washington, D.C., U.S. Department of Transportation. Pub. no. FWHA-HI-88-054.

Federal Highway Administration (2001). Keeping the Noise Down, Highway Traffic Noise Barriers, Publication No. FHWA-EP-01-004 HEPN/2-01(10M)E. http://www.fhwa.dot.gov/environment/keepdown.htm.

Fellers, G. M. and G. Guscio (2002). Red-legged Frog Surveys at Giacomini Wetlands, Point Reyes National Seashore. Point Reyes, California, National Park Service Report.

FEMA (1997). Flood insurance study, Marin County, California, unincorporated areas, Federal Emergency Management Agency Community Number 060173.

Fenner, P., W. W. Brady, et al. (1985). "Effects of regulated water flows on regeneration of Fremont cottonwood." Journal of Range Management **38**: 135-138.

Festa, J. F. and D. V. Hansen (1976). "A two-dimensional numerical model of estuarine circulation: the effects of altering depth and river discharge." Estuarine and Coastal Marine Science **4**: 309-323.

Festa, J. F. and D. V. Hansen (1978). "Turbidity maxima in partially mixed estuaries: a two-dimensional numerical model." Estuarine and Coastal Marine Science **7**: 347-359.

Fischer, D. T., S. V. Smith, et al. (1996). "Simulation of a century of runoff across the Tomales watershed. Marin County, California." Journal of Hydrology **186**: 253-273.

Fisher, R. N. and H. B. Shaffer (1996). "The decline of amphibians in California's Great Central Valley." Conservation Biology **10**: 1387-1397.

Flores, R. E. and W. R. Eddleman (1993). "Nesting biology of the California black rail in Southwestern Arizona." Western Birds **24**: 81-88.

Fong, D. (1999). California Freshwater Shrimp (*Syncaris pacifica*) Surveys within Point Reyes National Seashore and Golden Gate National Recreation Area, Unpublished report prepared for Golden Gate National Recreation Area and the U.S. Fish and Wildlife Service, Portland Regional Office**:** 27.

Fong, D. (2002). Western Pond Turtle (*Clemmys marmorata*) Inventory, Golden Gate National Recreation Area, Prepared for Golden Gate National Recreation Area, Division of Resource Management.

Fong, D. (2003). California Freshwater Shrimp (*Syncaris pacifica*) and Tirewater Goby (*Eucylogobius newberryi)* Surveys, Giacomini Ranch, Marin County., Golden Gate National Recreation Area / Point Reyes National Seashore.

Freifelder, R. R., S. V. Smith, et al. (1998). "Cows, humans and hydrology in the nitrogen dynamics of a grazed rural watershed." Journal of Environmental Management **52**: 99-111.

Friedman, J. M., W. R. Osterkamp, et al. (1998). "Downstream effects of dams on channel geometry and bottomland vegetation: Regional patterns in the Great Plains." Wetlands **18**: 619-633.

Frost, S. W. (1935). "The food of *Rana catesbeiana* Shaw." Copeia 1935: 15-18.

Galloway, A. (1977). "Geology of the Point Reyes Peninsula, Marin County, California." California Division of Mines and Geology Bulletin 202: 72.

Gambrell, R. P. (1994). "Trace and toxic metals in Wetlands - A review. J. ." Journal of Environmental Quality **23**: 883-891.

Gambrell, R. P., R. D. DeLaune, et al. (1991a). Redox processes in soils following oxygen depletion. Plant life under oxygen deprivation. M. B. Jackson, D. D. Davies and H. Lumken. The Hague, The Netherlands, SPB Academic Publishing bv**:** 101-117.

Gambrell, R. P., J. B. Wiesepape, et al. (1991b). "The effects of pH, redox, and salinity on metal release from a contaminated sediment." Water, Air, and Soil Pollution **57-58**: 359-367.

Gandesbery, T., F. Hetzel, et al. (1999). Ambient concentrations of toxic chemicals in San Francisco Bay sediments: Summary. In 1997 Annual Report: San Francisco Estuary Regional Monitoring Program for Trace Substances. Richmond, San Francisco Estuary Institute**:** 140–147.

Ganju, N. K., D. H. Schoellhamer, et al. (2004). "Tidal oscillation of sediment between a river and a bay: a conceptual model." Estuarine, Coastal, and Shelf Science **60**(6): 81-90.

Garcia and Associates (2004). National Register of Historic Places Evaluation for the Giacomini Dairy Farm and Inverness Park Properties, Point Reyes National Seashore, Marin County, California, Submitted to URS Corp., Chico, California.

Ghodrati, F. and R. Tuden (2005). Pathogens in Tomales Bay Watershed: Total Maximum Daily Load (TMDL). Proposed Basin Plan Amendment and Staff Report, California Regional Water Control Board, San Francisco Bay Region.

Gilbert, G. K. (1908). Characteristics of the rift and Earth movement on the fault, Tomales Bay to Bolinas Lagoon. Report of the State Earthquake Investigation Commission. A. C. Lawson, Carnegie Institution of Washington Publication 87. **1:** 30-35, 66-87.

Goals Project (1999). Baylands Ecosystem Habitat Goals: A report of habitat recommendations, Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project, U.S. Environmental Protection Agency, San Francisco, California/ San Francisco Regional Water Quality Control Board, Oakland, California.

Goman, M. F. (2005). "Discrimination of Estuarine Marsh Subenvironments (San Francisco Bay, California, USA) Using a Multivariate Statistical Calibration of Abiotic Sediment Properties." Journal of Sedimentary Research **75**(3): 398-408.

Greene, E. L. (1894). Manual of the botany of the region of San Francisco Bay. San Francisco, California, Cubery and Company.

Grinnell, J. and A. H. Miller (1944). "The distribution of the birds of California." Pacific Coast Avifauna **27**.

Grosholz, E. D. and P. Olin (2000). Reducing losses of Manila clams to the European green crab, California Sea Grant/University of California Cooperative Extension leaflet.

Grosholz, E. D., G. M. Ruiz, et al. (2000). "The impacts of a nonindigenous marine predator in a California Bay." Ecology **81**(5): 1206-1224.

Gross, E. S. and M. T. Stacey (2003). "Three-dimensional hydrodynamic modelling of Tomales Bay, California." Estuarine and Coastal Modeling: 646-666.

Grove, K., K. Colson, et al. (1995). Stratigraphy and structure of the late Pleistocene Olema Creek Formation, San Andreas Fault zone north of San Francisco, California. Recent geologic studies in the San Francisco Bay area, Pacific Section: Society for Sedimentary Geology. E. M. Sanguines, D. W. Andersen and A. Buising. **76:** 55-76.

H. Esmaili and Associates (1980). Substrate Enhancement/Sediment Management Study, Lagunitas Creek, Marin County. Phase II: Sediment transport and substrate conditions 1979-1980.

Haith, D. A. and L. L. Shoemaker (1987). "Generalized Watershed Loading Functions for Stream Flow Nutrients." Water Resources Bulletin **23**(3): 471-478.

Harcourt-Baldwin, J. (2003). Water Circulation within Tomales Bay, California, USA - A Mediterranean Climate Estuary. Cape Town, South Africa, University of Cape Town.

Hardwick, J. E. (1973). Biomass estimates of spawning herring, *Clupea harengus pallasi*, herring eggs, and associated in Tomales Bay, California Department of Fish and Game 59**:** 36-61.

Hart, E. W. and W. A. Bryant (1997). Fault-rupture hazard zones in California, Department of Conservation Division of Mines and Geology Special Publication 42.

Hayes, M. P. and M. R. Jennings (1986). "Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana)* responsible?" Journal of Herpetology **20**: 490-509.

Healey, M. C. (1991). Life History of Chinook Salmon (Oncorhynchus tschawytscha). Pacific Salmon Life Histories. C. Groot and L. Margolis**:** 313-393.

Hearn, C. J. and J. L. Largier (1997). "The summer buoyancy dynamics of a shallow Mediterranean estuary and some effects of changing bathymetry: Tomales Bay, California." Estuarine, Coastal and Shelf Science **45**: 497-506.

Hedgpeth, J. W. (1975). California fresh and brackish water shrimps with special reference to the present status of *Syncaris pacifica* (Holmes). Unpublished report, Office of Endangered Species. U. S. Fish and Wildlife Service Report, Contract 14-16-008-841**:** 34.

Heimann, D. C. (2001). Numerical Simulation of Streamflow Distribution, Sediment Transport, and Sediment Deposition along Long Branch Creek in Northeast Missouri. Lee's Summit, Missouri, U.S.G.S. Report no. WRIRO1-4269.

Heimann, D. C. and M. J. Roell (2000). "Sediment Loads and Accumulation in a Small Riparian Wetland System in Northern Missouri." Wetlands **20**(2): 219-231.

Herzog, M., L. Liu, et al. (2004). San Francisco Bay Marsh Project, Annual Report: Distribution, Abundance, and Reproductive Success of Tidal Marsh Birds. Stinson Beach, California, PRBO Conservation Science.

Hickman, J. C., Ed. (1993). The Jepson manual: Higher Plants of California. Berkeley, California, University of California Press.

Holland, R. F. (1986). Preliminary descriptions of the terrestrial natural communities of California. Sacramento, California, State of California, The Resources Agency, Nongame Heritage Program, Dept. Fish & Game,.

Hollibaugh, J. T., R. W. Buddemeier, et al. (1991). "Contributions of colloidal and high molecular weight dissolved material to alkalinity and nutrient concentrations in shallow marine and estuarine systems." Marine Chemistry **33**: 1-27.

Hollibaugh, J. T., B. E. Cole, et al. (1988). "Tomales Bay, California: a "macrocosm" for examining biogeochemical coupling at the land-sea interface." Eos **36**: 843-845.

Hollis, J. (1967). Toxicant Diseases of Rice. Louisiana Agr. Exp. Station, Bull. 614. Baton Rouge, Louisiana, Louisiana State University.

Hornberger, M. I., S. N. Luoma, et al. (1999). "Historical trends of metals in the sediments of San Francisco Bay, California." Marine Chemistry **64**: 39-55.

Horne, A. (2000). Professor, University of California, Berkeley: Unpublished data from a course on recycled water.

Howell, J. T. (1970). Marin Flora: A Manual of the Flowering Plants and Ferns of Marin County, California. Berkeley and Los Angeles, California, University of California Press.

HUD (2004). The Noise Guidebook, Revised 2004. Washington, D.C., U.S. Department of Housing and Urban Development. http://www.hud.gov/offices/cpd/energyenviron/environment/resources/guidebooks/noise/index.cfm.

Huron County Science Committee (2005). Sources and Mechanisms of Delivery of E. coli (bacteria) Pollution to the Lake Huron Shoreline of Huron County. Interim Report, Science Commitee to Investigate Sources of Bacterial Pollution of the Lake Huron Shoreline of Huron County.

Hymanson, Z., D. Mayer, et al. (1994). Long-Term Trends in Benthos Abundance and Persistence in the Upper Sacramento- San Joaquin Estuary, Summary Report: 1980-1990, IEP Technical Report 38**:** 68.

Illingworth & Rodkin and Nichols Berman (2002). Marin Countywide Plan: Air Quality Technical Background Report. San Rafael, California, Marin County Community Development Agency.

International Conference of Building Officials (1997). Universal Building Code.

Invasive Spartina Project (2004). 2004 Monitoring Survey, San Francisco Estuary Invasive Spartina Project.

IWCP (2001). Did You Know?…Healthy Wetlands Devour Mosquitoes Fact Sheet. Indianopolis, Indiana, Indiana Wetlands Conservation Plan. Indiana Department of Natural Resources. www.in.gov/dnr/fishwild/publications/inwetcon/hlywet.pdf.

Jacobs, D. K. and D. Earl (2005). Genetic analysis of tidewater goby population in Tomales Bay and other central California coastal watersheds. Point Reyes Station, California, University of California at Los Angeles. Report to Point Reyes National Seashore.

Jaffe, B., R. Smith, et al. (2001). Sedimentation, erosion, and mercury contamination: The story of hydraulic gold mining debris in north San Francisco Bay. Proceedings of the 5 th Biannual State of the Estuary Conference:San Francisco Estuary: Achievements, trends and the and the future, Palace of the Fine Arts Theatre, San Francisco.

Jaffe, B., R. Smith, et al. (1996). Sedimentation changes in San Pablo Bay 1856-1983. 3rd Biennial State of the Estuary Conference, October, San Francisco, California.

Jennings, M. R. and M. P. Hayes (1989). Final Report of the Status of the California Red-Legged frog in the Pescadero Marsh Natural Preserve, Prepared for the California Department of Parks and Recreation Under Contract No. 4-823-9018 With the California Academy of Sciences**:** 56.

Johnson, R. G., W. R. Bryant, et al. (1961). Ecological survey of Tomales Bay: preliminary report of the 1960 hydrographic survey. Bodega Bay, California, Pacific Marine Station, University of the Pacific.

Johnson, R. G., J. A. Juskevice, et al. (1971). Environmental study of Tomales Bay, Vol. 4: biological characteristics of Tomales Bay.

Johnson, S. C., R. Burgess, et al. (1976). "Forest overstory vegetation and environment on the Missouri River floodplain in North Dakota." Ecological Monographs **46**(1): 59-84.

Johnson, W. C. (1992). "Dams and riparian forests: case study from the upper Missouri River." Rivers **3**: 229-242.

Johnson, W. C. (1994). "Woodland expansion in the Platte River, Nebraska: patterns and causes." Ecological Monographs **64**: 45-84.

Johnson, W. C. (1998). "Adjustment of riparian vegetation to river regulation in the Great Plains, USA." Wetlands **18**: 608-618.

Jones & Stokes Associates (1995). Draft Environmental Impact Report and Environmental Impact Statement, Delta Wetlands Project, Prepared for State Water Resources Control Board and U.S. Army Corps of Engineers, September 1995.

Joye, S. B. and J. T. Hollibaugh (1995). "Influence of sulfide inhibition of nitrification on nitrogen regeneration in sediments." Science **270**: 623-625.

Judah, L. R. (2000). Filtering Capacity and Dietary Requirements of the Pacific Oyster, *Crassastrea gigas*, San Francisco State University**:** 7.

Kadlec, R. H. and R. L. Knight (1996). Treatment Wetlands. New York, New York, Lewis Publishers.

Kelly, J. (2001). "Distribution and abundance of winter shorebirds on Tomales Bay, California: implications for conservation." Western Birds **32**: 145-166.

Kelly, J. P. (2003). "Bird Alphabet Soup: A report on the All Taxa Biodiversity Inventory of Tomales Bay." The Ardeid 2003: 8-12.

Kelly, J. P. and S. L. Tappen (1998). "Distribution, abundance, and implications for conservation of winter waterbirds on Tomales Bay, California." Western Birds **29**: 103-120.

Ketcham, B. (1998). Hydrologic monitoring station information summary, National Park Service coho and steelhead recovery project. Point Reyes Station, California, Point Reyes National Seashore.

Ketcham, B. (2001). Point Reyes National Seashore Water Quality Monitoring Report: May 1999-May 2001. Point Reyes Station, California, Point Reyes National Seashore**:** 177.

Ketcham, B. (*in prep.*). Summery of Bear Valley Creek Salmonids. Point Reyes Station, California, Pont Reyes National Seashore.

KHE (2006a). Hydrologic Feasibility Assessment Report: Giacomini Wetland Restoration Project. Point Reyes National Seashore. Point Reyes Station, California, Prepared for Point Reyes National Seashore.

KHE (2006b). Phase I Hydrology, Hydraulic, and Geomorphic Investigations and Engineering Design for Bear Valley Creek Watershed Enhancement and Fishery Restoration Project. Point Reyes National Seashore, California. Point Reyes Station, California, Prepared for Point Reyes National Seashore Association.

KHE, LSA Associates Inc., et al. (2004). Technical evaluation of potential trail alignments for the Giacomini wetland restoration project, Point Reyes National Seashore, Marin County, California, Submitted to: Point Reyes National Seashore, September**:** 34.

Kimmerer, W. J. (1993). "Distribution patterns of zooplankton in Tomales Bay, California." Estuaries **16**(2): 264-272.

Kimmerer, W. J. (2004). "Open Water Processes of the San Francisco Estuary: From Physical Forcing to Biological Responses." San Francisco Estuary & Watershed Science **2**(1): 2-140.

Kimmerer, W. J., J. R. Burau, et al. (1998). "Tidally oriented vertical migration and position maintenance of zooplankton in a temperate estuary." Limnology and Oceanography **43**: 1697-1709.

Kimmerer, W. J., S. V. Smith, et al. (1993). "A simple heuristic model of nutrient cycling in an estuary." Estuarine, Coastal and Shelf Science **37**: 145-159.

Knudsen, K. L., J. M. Sowers, et al. (2000). Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine County San Francisco Bay Region, California. Denver, Colorado, USGS (U.S. Geological Survey).

Knudsen, K. L., R. C. Witter, et al. (1999). Final technical report: evidence for earthquake-induced, rapid subsidence in estuarine sediment along the Northern San Andreas Fault., U.S. Geological Survey, National Earthquake Hazards Reduction Program, award no. 1434-HQ-97-GR-03009, program elements: I and II**:** 44.

Korschgen, L. J. and D. L. Moyle (1955). "Food habits of the bullfrog in central Missouri farm ponds." American Midland Naturalist **54**: 332-341.

Kramer, V. L., J. N. Collins, et al. (1995). "Reduction of Aedes dorsalis by enhancing tidal action in a northern California marsh." American Mosquito Control Association **11**: 389-395.

Kroeber, A. L. (1953). Handbook of Indians of California. Berkeley, California, California Book Company, Ltd.

Kwasny, D. C., M. Wolder, et al. (2004). Central Valley Joint Venture: Technical Guide to Best Management Practices for Mosquito Control in Managed Wetlands, California Department of Fish and Game, Lands and Facilities Branch and U.S. Fish and Wildlife Service.

LandPeople (2005). Technical evaluation of public access alignments for the Giacomini wetland restoration project, Point Reyes National Seashore, National Park Service, Prepared for: Kamman Hydrology & Engineering, Inc., with Jakaby Engineering**:** 69.

Largier, J. L., C. J. Hearn, et al. (1997a). Density structures in low inflow estuaries. Buoyancy Effects on Coastal and Estuarine Dynamics. David G. Aubrey and C. T. Friedrichs, American Geophysical Union, Coastal and Estuarine Studies. **53:** 227-241.

Largier, J. L., J. T. Hollibaugh, et al. (1997b). "Seasonally hypersaline estuaries in mediterranean climate regions." Estuarine, Coastal and Shelf Science **45**: 789-797.

Lawson, A. C. (1908). The California Earthquake of April 18, 1906. Report of the State Earthquake Investigation Commission, Carnegie Institution of Washington Publication 87.

Leonard Charles and Associates (2007). East Shore Wastewater Improvement Project: Final EIR. Prepared for: County of Marin, Community Development Agency, San Rafael, California.

Leopold, L. B. (1994). A View of the River. Cambridge, Massachusetts, Harvard University Press.

Levy, D. A. and T. G. Northcote (1982). "Juvenile salmon residency in a marsh area of the Fraser River estuary." Canadian Journal of Fisheries and Aquatic Sciences **39**: 270-276.

Lewis, D. J., E.R. Atwill, et al. (2001). Linking on-farm dairy management practices to storm-flow fecal coliform loading for California coastal watersheds. Santa Rosa, California, University of California Cooperative Extension.

Liberg, O. (1984). Food Habits and Prey Impact by Feral and House-Based Domestic Cats in a Rural Area in Southern Sweden. Journal of Mammalogy, **65**(3): 424-432.

Liu, A. E. (2001). Restoration of a San Francisco Bay Salt Marsh: Evaluating Corixid and Mosquito Populations. Environmental Sciences (196). Berkeley, California, University of Berkeley.

Livingston, D. (1994). Ranching on the Point Reyes Penninsula: A History of the Dairy and Beef Ranches within the Point Reyes National Seashore, 1834-1992. Point Reyes Station, California, National Park Service.

Livingston, D. (1999). History of Point Reyes Station. Point Reyes Station Community Plan. San Rafael, California, Marin County Community Development Agency, 2000.

Long, E. R., M. F. Buchman, et al. (1990). "Comparative Evaluation of Five Toxicity Tests with Sediments from San Francisco Bay and Tomales Bay, California." Environmental Toxicity and Chemistry **9**(9): 1193-1214.

Lundquist, J. D. and D. R. Cayan (2002). "Seasonal and Spatial Patterns in Diurnal Cycles in Streamflow in the Western United States." Journal of Hydrometerology: 591-603.

MacDonald, K. B., and M. G. Barbour (1974). Beach and salt marsh vegetation of the North American Pacific coast. Ecology of halophytes. R. J. Reimold and W. H. Queen. New York, New York, Academic Press**:** 175-233.

Magnusson, A. and R. Hilborn (2003). "Estuarine Influence on Survival Rates of Coho (Oncorhynchus kisutch) and Chinook Salmon (Oncorhynchus tshawytscha) Released from Hatcheries on the U.S. Pacific Coast." Estuaries **26**(4B): 1094-1103.

Malm, W. C. (2000). Introduction to Visibility. #CA-2350-97. Fort Collins, Colorado, Colorado State University, Cooperative Institute for Researching the Atmosphere: T097-04, T098-06.

Manolis, T. (1978). "Status of the black rail in central California." Western Birds **9**: 151-158.

Marin and Sonoma County Mosquito and Vector Control District (2005). West Nile Virus, http://www.msmosquito.com/westnile.html.

Marin County Community Development Agency (1994). Marin Countywide Plan. San Rafael, California, Marin County Comprehensive Planning Development.

Marin County Community Development Agency (2001). Point Reyes Station Community Plan. San Rafael, California.

Marin County Community Development Agency (2003). Key Trends, Issues, and Strategies Report. San Rafael, California, Marin County Community Development Agency.

Marin County Community Development Agency (2004). Marin Countywide Plan Noise Element Background Report. San Rafael, California.

Marin County Community Development Agency (2005). Marin Countywide Plan: Revised Public Review Draft. San Rafael, California.

Marin County Comprehensive Planning Department (1981). Marin County Local Coastal Program Unit 2. San Rafael, California, Marin County Comprehensive Planning Department/ Marin County Community Development Agency.

Marin County Grand Jury (2004). Septic System Regulation in Marin. Marin County Grand Jury Report. San Rafael, California

Markmann, C. (1986). Benthic Monitoring in the Sacramento-San Joaquin Delta. Results from 1975 through 1981, IEP Technical Report 12**:** 51.

Mason, J. (1983). "The Trout Hatchery." Point Reyes Historian **8**(3): 820-822.

May, M. (1995). *Lepidium latifolium* L. in the San Francisco Estuary. Berkeley, California, Department of Geography, University of California, Berkeley.

MBARI (2002). 2002 Annual Report, Monterey Bay Aquarium Research Institute.

McKee, L., N. Ganju, et al. (2002). Estimates of suspended sediment flux entering San Francisco Bay from the Sacramento and San Joaquin Delta. Report prepared for the Sources Pathways and Loading Workgroup (SPLWG) of the San Francisco Bay Regional Monitoring Program for Trace Substances (RMP). SFEI contribution 65. San Francisco Estuary Institute.

Mendelssohn, I. A., K. L. McKee, et al. (1982). Sublethal stresses controlling Spartina alterniflora productivity. Wetlands Ecology and Management. B. Gopal, R. E. Turner, R. G. Wetzel and D. F. Whigham. Jaipur, India, National Institute of Ecology and International Science Publications**:** 223-242.

Michigan State University (2001). Money Generation Model Analysis for Point Reyes National Seashore, Department of Park, Recreation and Tourism Resources.

Miller, B. A. and S. Sadro (2003). "Residence Time and Seasonal Movements of Juvenile Coho Salmon in the Ecotone and Lower Estuary of Winchester Creek, South Slough, Oregon." Transactions of the American Fisheries Society **132**: 546-559.

Mitsch, W. J. and J. G. Gosselink (1993). Wetlands. New York, New York, John Wiley & Sons.

Mitsch, W. J. and J. G. Gosselink (2000). Wetlands. New York, New York, John Wiley & Sons.

MMWD (2005). Lagunitas Creek Salmon Spawner Survey Report 2004-2005. Corte Madera, California, Prepared by Eric Ettlinger, Gregory M Andrew, Jacquelyn Neuffer, and Francesca Rohr of Marin Municipal Water District.

MMWD (2006). Lagunitas Creek Salmon Spawner Survey Report 2005-2006. Corte Madera, California, Prepared by Eric Ettlinger, Chaya Kranz, Francesca Rohr, and Gregory M Andrew of Marin Municipal Water District.

Moore, T. O. and J. J. Mello (1995). Pacific Herring, *Clupeas pallasi*, studies and fishery management in Tomales Bay, 1992-1995, with notes on Humboldt Bay and Crescent City area landings, California Department of Fish and Game, Marine Resources Division. Administrative Report :95-5.

Morey, S. (1990). Bullfrog, *Rana catesbeiana*. California Wildlife Habitat Relationships System. R. Duke and E. C. Beedy, California Department of Fish and Game, California Interagency Wildlife Task Group. http://www.dfg.ca.gov/whdab/html/a046.html.

Moyle, P. B. (1973). "Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California." Copeia 1973: 18-22.

Moyle, P. B. (1976). Inland fishes of California. Berkeley, California, University of California Press.

Munro-Fraser, J. P. (1880). History of Marin County, California. San Francisco, California, Alley, Browne, & Co.

Murphy, D. (2006). San Francsico Watchlist, Towee.net: http://www.towhee.net/birdsf/watch.html.

Naiman, R. J., R.E. Bilby, et al. (2002). "Pacific salmon, nutrients, and the dynamics of freshwater and riparian ecosystems." Ecosystems **5**: 399-417.

Napa County Mosquito Abatement District (2004). Foul Water Mosquito: General Information, Napa County Mosquito Abatement District: http://www.napamosquito.org/Mosquitos/FoulWaterMosquito.htm#FOUL_WATER_MOSQUITO.

NatureServe (2000). Precious Heritage: Hot spots of rarity and richness. http://www.natureserve.org/publications/preciousHeritageCharts.jsp.

NCSA (2007). Fatality Analysis Reporting System (FARS) Web-Based Encyclopedia. National Center for Statistics and Analysis website. http://www-fars.nhtsa.dot.gov/main.cfm

Newland, M. (2003). A Cultural Resources Study for the Giacomini Wetlands Restoration Project. Point Reyes Station, California, Point Reyes National Seashore and Anthropological Studies Center, Sonoma State University**:** 48.

Nichols, F. H. and M.M. Pamatmat (1988). The ecology of the soft-bottom benthos of San Francisco Bay: A community profile, Biological Report 85 (719), United States Fish and Wildlife Service**:** 73.

Nielsen, J. Anadromous Salmonids of the MBNMS, U.S.D.A. Forest Service and Hopkins Marine Station. http://www.montereybay.noaa.gov/sitechar/fish2.html.

Niemi, T. M. and N. T. Hall (1996). "Historical changes in the tidal marsh of Tomales Bay and Olema Creek, Marin County, California." Journal of Coastal Research **12**(1): 90-102.

NMWD (1967). Appendix: Water & Sewage Feasibility Study. East Shore Development Tomales Bay, North Marin Water District. Prepared in conjunction with Brown and Caldwell Consulting.

NMWD (1997). Lagunitas Creek Salinity Intrusion Study Point Reyes Service Area. Novato, California, North Marin Water District. Prepared in conjunction with Soldati Engineering Services.

NOAA (1990). Estuaries of the United States: vital statistics of a national resource base, Strategic Assessment Branch, Ocean Assessments Division, Office of Oceanography and Marine Assessment, National Oceanic and Atmospheric Administration**:** 76.

NOAA (2001). Sea level variations of the United States 1854-1999. NOAA Technical Report NOS CO-OPS 36. Silver Springs, Maryland, National Oceanographic and Atmospheric Administration**:** 65 pp.

NOAA-Fisheries (1996). "Endangered and Threatened Species; Threatened Status for Central California Coast Coho Salmon Evolutionarily Significant Unit (ESU). 50 CFR Part 227. Final Rule. October 31 2006. National Marine Fisheries Service." Federal Register **61**(212): 56138-56149.

NPS (1980). General Management Plan, Environmental Analysis, Golden Gate National Recreation Area and Point Reyes National Seashore.

NPS (1993). Point Reyes Fire Management Plan, Point Reyes National Seashore.

NPS (1997). Point Reyes National Seashore Visitor Use Survey Report: 1997. Point Reyes Station, California, Point Reyes National Seashore, National Park Service.

NPS (1998a). NPS 28: Cultural Resource Management Guideline, National Park Service.

NPS (1998b). Point Reyes National Seashore Visitor Use Survey Report: 1998. Point Reyes Station, California, Point Reyes National Seashore, National Park Service.

NPS (1999). Point Reyes Resource Management Plan, Point Reyes National Seashore.

NPS (2001). Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making Handbook. Washington, D.C., National Park Service.

NPS (2002). Visitor Service Report (March 2002, June 2002, September 2002 and December 2002), National Park Service.

NPS (2004a). Final Fire Management Plan Environmental Impact Statement, Point Reyes National Seashore and North District of Golden Gate National Rereation Area.

NPS (2004b). NEPA Overview and NPS Mandates, Prepared by RED, Inc. Communications for the National Park Service National Resource Program Center, Environmental Quality Division.

NPS (2006). 2006 Management Policies, National Park Service.

NHTSA (2004a). Traffic Safety Facts, 2004 Data: Pedestrians. National Center for Statistics and Analysis, National Highway Traffic Safety Administration. DOT HS 809 912.

NHTSA (2004b). Traffic Safety Facts, 2004 Data: Pedalcyclists. National Center for Statistics and Analysis, National Highway Traffic Safety Administration. DOT HS 809 912.

NHTSA (2007). Fatality Analysis Reporting System (FARS) Web-Based Encyclopedia. National Center for Statistics and Analysis website, National Highway Traffic Safety Administration. http://www-fars.nhtsa.dot.gov/main.cfm

Oberdorfer, J. A., M. A. Valentino, et al. (1990). "Groundwater contribution to the nutrient budget of Tomales Bay, California." Biogeochemistry **10**(199-216).

OPR (1994). CEQA and Historical Resources. CEQA technical advise series. Governor's Office of Planning and Research. Sacramento, California, Governor's Office of Planning and Research.

Orford, R. R. (1991). "Diagnosing and Treating Environmental Health Problems. Interview with Robert R. Orford." Minnesota Medicine **74**: 7-10.

Overpeck, J. T., B. L. Otto-Bliesner, et al. (2006). "Paleoclimatic Evidence for Future Ice-Sheet Instability and Rapid Sea-Level Rise." Science **311**(5768): 1747-1750.

Palmateer, G. and D. Huber (1985). Lake Huron beach study - a microbiological water quality evaluation of Grand Bend beach and related pollution sources in 1985, Southwest Region, Ontario Ministry of the Environment**:** 31.

Palmer, R. S., Ed. (1962). Handbook of North American Birds. Vol. 1. Loons through Flamingos. New Haven, Connetticut, Yale University Press.

Parsons, L. (2003). Botanical Survey Report: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L. (*in prep.*). Pre-restoration water quality conditions in the Giacomini Wetland Restoration Project Area. Point Reyes Station, California, Point Reyes National Seashore.

Parsons, L. and L. Allen (2004b). Vegetation Communities Report: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L. and L. Allen (2004c). Final Report on Screening for Sediment Contamination in the Study Area: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L., L. Allen, et al. (2005). Delineation of Wetlands and Deepwater Habitats: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L., C. Donovan, et al. (2004). Wetlands Mapping and Assessment in the Tomales Bay Watershed. Point Reyes Station, California, Point Reyes National Seashore.

Parsons, L. S. and J. E. Martini-Lamb (2003). Turning Waste Into Water: Use of Reclaimed Wastewater for Restoration and Wildlife Habitat Enhancement Purposes. Estuaries on the Edge: Convergence of Ocean, Land and Culture, Estuarine Research Federation Conference 2003.

Pearson, J. M. (2000). Fish and mysids in two creeks/estuary systems in Marin County, California. Master's Thesis. San Francisco State University.

Pendleton, E. A., E. R. Thieler, et al. (2005). Relative Coastal Vulnerability Assessment of Golden Gate National Recreation Area to Sea-Level Rise. USGS Open-File Report 2005-1058, U.S. Geological Survey.

Peterson, D., T. Conomos, et al. (1975). "Location of the non-tidal current null zone in northern San Francisco Bay." Estuarine and Coastal Marine Science **3**: 1-11.

Pettigrew, J. (2004). Summer Habitat Associations of Nearshore Fishes in Tomales Bay, California: A Report to Point Reyes National Seashore Association and the All Taxa Biodiversity Inventory of Tomales Bay.

Pettigrew, J. (2005). Removal and Nutrient Analysis of Invasive Green Crabs in Tomales Bay, California. San Francisco, California, San Francisco State University.

Peverly, J. H. and R. J. Kopka (1991). "Changes in Al, Mn and Fe from sediments and aquatic plants after lake drawdown." Water, Air, & Soil Pollution **57-58**(1): 399 - 410.

Philip Williams Associates (PWA), Wetland Research Associates, et al. (1993). An Evaluation of the Feasibility of Wetland Restoration on the Giacomini Ranch, Marin County, Prepared for the National Park Service Contract #CX 8140-1-0024.

Portnoy, J. W. (1999). "Salt Marsh Diking and Restoration: Biochemical Implications of Altered Wetland Hyrdology." Environmental Management **24**(1): 111-120.

Postma, V. H. and K. Kalle (1955). "On the development of turbid zones in the lower course of rivers with special consideration of conditions in the lower Elbe." Sond. Deutsch Hydr. **8**: 137-144.

PRBO Conservation Science (2006). Bird Species of Special Concern, PRBO Conservation Science: http://www.prbo.org/cms/index.php?mid=252&module=browse.

Prentice, C., T. N. Niemi, et al. (1991). Quaternary tectonics of the Northern San Andreas Fault, San Francisco Peninsula, Point Reyes, and Point Arena, California. Geologic Excursions in Northern California: San Francisco to the Sierra Nevada. D. Sloan and D. Wagner. Sacramento, California, California Department of Conservation, Division of Mines and Geology. **109:** 25-34.

PWA (1996a). Analysis of impacts of Giacomini water rights transfer and potential removal of dam. April 18., Philip Williams Associates. Prepared for National Park Service, Point Reyes National Seashore. Point Reyes Station, California.

PWA (1996b). Lagunitas Creek Salinity Intrusion Data. May 3. Point Reyes Station, California, Philip Williams Associates. Prepared for National Park Service, Point Reyes National Seashore.

PWA (2005). Chicken Ranch Beach Restoration Plan

Scoping Document . Prepared for Environmental Action Committee of West Marin. Philip Williams & Associates, Ltd. PWA REF. #1761.

Questa Engineering Corp. (1990). Olema Creek Erosion and Sedimentation Study, Prepared for the National Park Service.

Questa Engineering Corp. (2000). Hydrogeologic Investigation for Point Reyes Affordable Housing Project. Point Reyes Station, California, Point Reyes Affordable Housing Project.

Questa Engineering Corp. (2001). Point Reyes Affordable Homes Project - Response to Comments on Hydrogeologic Study. October 10, 2001. Point Reyes Station, California, Point Reyes Affordable Housing Project.

Radovich, R. A. (1993). An identification and generalized classification of the wetlands of California (with accompanying key). Department of Fish and Game, Environmental Services Division. Administrative Report 93-2.

Rasheed, K., TK Anujee, JK Ajith, and AN Balchand (1997). Transport processes in tropical estuaries - significance of circulation and formation of turbidity maximum. Presentation at IAPSO Joint Assembly.

Raup, H. F. (1951). "The Italian-Swiss in California." California Historical Society Quarterly **30**: 305-314.

Reed, D. J. and J. Donovan (1994). The character and composition of the Columbia River estuarine turbidity maximum. Changing Particle Fluxes in Estuaries: Implications from Science to Management. K. Dyer and R. Orth. Friedensborg, Denmark, ECSAERF22 Symposium, Olsen & Olsen Press**:** 445-450.

Regional Water Quality Control Board (RWQCB) (1995a). San Francisco Bay Basin (Region 2) Water Quality Control Plan, California Regional Water Quality Control Board, San Francisco Bay Region**:** 167.

Regional Water Quality Control Board (RWQCB) (1995b). Water Quality Control Plan, Beneficial Uses, Regional Water Quality Control Board, Region 2**:** 2-1 to 2-11.

Reimers, P. E. (1973). "The length of residence of juvenile fall chinook salmon in Sixes River, Oregon." Research Reports of the Fish Commission of Oregon **4**(2): 1-42.

Remane, A. (1971). Ecology of brackish water. Biology of brackish water. A. Remane and C. Schlieper. New York, Wiley Inter-science**:** 1-210.

Rood, S. B. and J. M. Mahoney (1990). "Collapse of riparian poplar forests downstream from dams in western Canada in western prairies: Probable causes and prospects for mitigation." Environmental Management **14**(4): 451-464.

Rooney, J. J. and S. V. Smith (1999). "Watershed landuse and bay sedimentation." Journal of Coastal Research **15**(2): 478-485.

Rozsa, R. (1997). Tidal Wetland Restoration in Connecticut, Connecticut Department of Environmental Protection Tidal Wetland Restoration Program http://arboretum.conncoll.edu/publications/34/FRAME.HTM.

Rudo, M. O. (2006). Addendum Cultural Resources Survey For the Giacomini Wetlands Restoration Project, Point Reyes National Seashore, Marin County, California. July.

Rugg, M. (2000). Marin-Sonoma County Agricultural Runoff Influence Investigation 1999-2000 Summary, California Department of Fish and Game**:** 12.

Rugg, M. (2002). Marin-Sonoma Counties Agricultural Runoff Influence Investigation 2000-2001 Summary, California Department of Fish and Game**:** 45.

RWQCB (2001). Surface Water Ambient Monitoring Program (SWAMP) Workplan 2001-2002., San Francisco Bay Regional Water Quality Control Board.

RWQCB (2005). Pathogens in Tomales Bay Watershed Total Maximum Daily Load (TMDL): Staff Report. California Regional Water Quality Control Board, San Francisco Bay Region.

Ryan, A. and L. Parsons (*in prep.*). Vegetation Communities Report Supplement: Olema Marsh, South Levee Road, and Bear Valley Creek, Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Satawathananont, S., W. H. Patrick, Jr., et al. (1991). "Effect of controlled redox conditions on metal solubility in acid sulfate soils." Plant and Soil **133**(2): 281-290.

Savage, H. and B. Miller (1995). "House Mosquitoes of the U.S.A., *Culex pipiens* complex." Wing Beats **6**(2): 8-9.

Save the Bay (2005). Sandhill Crane, Save the Bay. http://www.savesfbay.org/site/pp.asp?c=dgKLLSOwEnH&b=1126835.

Sawyer, J. O. and T. Keeler-Wolf (1995). A Manual of California Vegetation. Sacramento, California, California Native Plant Society.

Scherer, A. M. and K. Grove (2003). "GIS analysis of Quaternary marine terraces, Point Reyes Peninsula, California." Geological Society of America Abstracts with Programs **35**(6): 332.

Schirokauer, D. and A. Parravano (2003). Enhanced Wetlands Inventory and Mapping Project. Point Reyes Station, California, Point Reyes National Seashore.

Schoellhamer, D. H. (2001). Influence of salinity, bottom topography, and tides on locations of estuarine turbidity maxima in northern San Francisco Bay. Coastal and estuarine fine sediment processes. M. W.H. and M. A.J. Amsterdam, The Netherlands, Elsevier**:** 343-356.

Schoellhamer, D. H. and J. R. Burau (1998). Summary of findings about circulation and the estuarine turbidity maximum in Suisun Bay, California. USGS Fact Sheet: FS-047-98, U.S. Geological Survey**:** 6.

Schofield, N. B. (1899). Notes on the movements of the young of the steelhead trout (*Salmo gairdneri*, Richardson) in Marin County streams, Appendix to the journals of Senate and Assembly of the 33rd session of the legislature of the state of California, G.H. Springer, State printer**:** 63-65.

Seashore (1989). Exotic Plant Management Plan, Point Reyes National Seashore.

Seashore (2001). Historic Landscapes of Point Reyes National Seashore. Point Reyes Station, California, Point Reyes National Seashore.

Seashore (2003). Trail Inventory and Condition Assessment with Recommendations, November 2003, Point Reyes National Seashore Official Website: http://www.nps.gov/pore/home_mngmntdocs_trailinventory2003.htm.

Seashore (2005). Tomales Bay Biodiversity Inventory Reaches 2000. National Seashore News. **1:** 3.

Seitzinger, S. P., R. V. Styles, et al. (2002). "Nitrogen Retention in Rivers: Model Development and Application to Watersheds in the Northeastern U.S.A." Biogeochemistry **57-58**(1): 199-237.

Serpa, L. (1991). California freshwater shrimp (*Syncaris pacifica*). Sacramento, California, Contract report to U.S. Fish and Wildlife Service**:** 44.

Serpa, L. (1992). Survey of the California freshwater shrimp, *Syncaris pacifica*, in Lagunitas Creek, Marin County, California, Prepared for Marin Municipal Water District. February 13, 1992**:** 51.

Serpa, L. (1996). Survey of the California freshwater shrimp, *Syncaris pacifica*, in Lagunitas Creek, Marin County, California, Prepared for Marin Municipal Water District. December 19, 1996**:** 26.

Sharpe, C. A. (1974). Tomales Bay Shellfish and Water Quality Study, Water Sanitation Section, California State Department of Health**:** 206.

Shuford, D. W. and I. C. Timossi (1989). Plant Communities of Marin County. Sacramento, California, California Native Plant Society.

Simenstad, C. A., K. L. Fresh, et al. (1982). "The role of Puget Sound and Washington coastal estuaries in the life history of Pacific salmon: an unappreciated function." Estuarine Comparisons, Academic Press.

Smith, J. J. (1987). Aquatic habitat and fish utilization of Pescadero, San Gregorio, Waddell and Pomponio Creek estuary lagoon systems, Prepared for the California Department of Parks and Recreation. May 31, 1987**:** 35.

Smith, S. V., R. M. Chambers, et al. (1996). "Dissolved and particulate nutrient transport through a coastal watershed-estuary system." Journal of Hydrology **176**: 181-203.

Smith, S. V. and J. T. Hollibaugh (1997). "Annual cycle and interannual variability of ecosystem metabolism in a temperate climate embayment." Ecological Monographs **67**(4): 509-533.

Smith, S. V. and J. T. Hollibaugh (1998). The Tomales Environment, University of Hawaii, School of Ocean and Earth Science and Technology and San Francisco State University, Tiburon Center. http://lmer.marsci.uga.edu/tomales/tomenv.html.

Smith, S. V., J. T. Hollibaugh, et al. (1989). "Tomales Bay, California: A case for carbon-controlled nitrogen cycling." Limnology and Oceanography **34**(1): 37-52.

Smith, S. V., J. T. Hollibaugh, et al. (1991). "Tomales Bay metabolism: C-N-P stoichiometry and ecosystem heterotrophy at the land-sea interface." Estuarine, Coastal and Shelf Science **33**(223-257).

Smith, S. V., W. J. Wiebe, et al. (1987). "Stoichiometry of C, N, P, and Si fluxes in a temperate-climate embayment." Journal of Marine Research **45**: 427-460.

Snyder and Smith Associates Inc. and Nichols-Berman (2002). Geology, Mineral Resources and Hazardous Materials Technical Background Report. Marin Countywide Plan. San Rafael, California, Prepared for the Marin County Community Development Agency.

Sokale, J. and L. Trulio. (2000). Wildlife and Public Access Study: an Ecological Investigation sponsored by the San Francisco Bay Trail Project. Preliminary Findings Report. San Francisco, California.

Sommer, B. and P. Horwitz (2001). Using carbon cycling as a surrogate for wetland function in conceptual modelling. Paper presented at SIL 2001 (28th Congress).

Soukup, M. A. and J. W. Portnoy (1986). "Impacts from mosquito control-induced sulfur mobilization in a Cape Cod estuary." Environmental Conservation **13**: 47-50.

South Coast Air Quality Management District (1993). CEQA Air Quality Handbook. Diamond Bar, California.

Spratt, J. D. (1989). "The distribution and density of eelgrass, *Zostera marina*, in Tomales Bay, California." California Fish and Game **75**(4): 204-212.

Stallcup, R. W. and J. P. Kelly (2004). Point-Count Surveys of Bird Use in Olema Marsh: Spring and Autumn 2004, Prepared for Point Reyes National Seashore by PRBO Conservation Science and Cypress Grove Research Center.

Stallcup, R. W. and J. P. Kelly (2005). Point-Count Surveys of Bird Use in Olema Marsh: Winter 2005, Prepared for Point Reyes National Seashore by PRBO Conservation Science and Cypress Grove Research Center.

Stebbins, R. C. (1954). Amphibians and reptiles of western North America. New York, New York, McGraw-Hill.

Stillwater Sciences (2004). Lagunitas limiting factors analysis. Phase I: Potential limiting factors and draft study plan for Phase II. Point Reyes Station, California, Prepared for Marin Resource Conservation District.

Stillwater Sciences (2005). Santa Clara River Parkway Floodplain Restoration Feasibility Study: Assessment of Geomorphic Processes (Draft). Oakland, California, Prepared for the California State Coastal Conservancy.

Stoffer, P. W. (2005). The San Andreas Fault In The San Francisco Bay Area, California: A Geology Fieldtrip Guidebook To Selected Stops On Public Lands, U.S. Geological Survey. Open-File Report 2005-1127.

Storer, T. I. (1922). "The eastern bullfrog in California." California Fish and Game **8**: 219-224.

Strecker, E. W., J. M. Kersnar, et al. (1992). The Use of Wetlands for Controlling Stormwater Pollution. Technical Advisor: Thomas E. Davenport, U.S. EPA, Region V. The Terrene Institute**:** 66.

Stromberg, J. C. and D. T. Patten (1990). "Riparian Vegetation Instream Flow Requirements: A Case Study from a Diverted Stream in the Eastern Sierra Nevada, California, USA." Environmental Management **14**(2): 185-195.

Stromberg, J. C., S. D. Wilkins, et al. (1993). "Vegetation- hydrology models:implication for management of *Prosopis velutina* (velvet mesquite) riparian ecosystems." Ecological Applications. **3**: 307-314.

Strong Associates (2003). Marin County Agricultural Economic Analysis. Final Report. San Rafael, California, Prepared for Marin County Community Development Agency.

Strong, D. R. and C. C. Daehler (1995). Alien cordgrasses in pacific estuaries. California Exotic Pest Plant Council 1995 Symposium Proceedings.

Sullivan, T. J., D. L. Peterson, et al. (2001). Assessment of Air Quality and Air Pollution Impacts in Class I National Parks in California. Denver, Colorado, Prepared in Cooperation with the Air Resources Division, National Park Service.

Swift, C. C., J. L. Nelson, et al. (1989). Biology and distribution of the tidewater goby, *Eucyclogobius newberryi* (Pisces: Gobiidae) of California, Natural History Museum of Los Angeles County, No. 404.

SWRCB (1995). Order: 95-17. Lagunitas Creek., State Water Resources Control Board.

Syrovetnik, K. and I. Neretnieks (2002). Use of Peat Bogs as Analogues for the Development and Validation of the Long-term Models for MSW Landfills. Department of Chemical Engineering. Stockholm, Sweden, Royal Institute of Technology.

Takekawa, J. Y., I. Woo, et al. (*in press*). Environmental threats to tidal marsh vertebrates of the San Francisco Bay estuary, Studies in Avian Biology. Cooper Ornithological Society.

Taylor, R. J. and E. D. Michael (1971). Habitat effects on monthly foods of bullfrogs in eastern Texas. Proceedings 25th Annual Conference Southeastern Association Game Fish Commissioners.

TBA (1995). Tomales Bay Watershed - Fall Newsletter. Point Reyes Station, California, Tomales Bay Association**:** 8.

TBWC (2002). Preliminary Tomales Bay Watershed Stewardship Plan: Second Draft, Prepared for the Tomales Bay Watershed Council, December 17, 2002.

TBWC (2003). Tomales Bay Watershed Stewardship Plan, Prepared for the Tomales Bay Watershed Council, July 2003.

Thompson, B. (2001). The Biogeography of Spartina Foliosa, San Francisco State University Geography Department. http://bss.sfsu.edu/holzman/courses/Fall01%20projects/Foliosa%20webpage.htm.

Thorpe, J. E. (1994). "Salmonid fishes and the estuarine environment." Estuaries **17**: 76–93.

Tomales Bay Shellfish Technical Advisory Committee (TBSTAC) (2000). Investigation of nonpoint pollution sources impacting shellfish growing areas in Tomales Bay, 1995-96. Final report, TBSTAC and the California State Water Resources Control Board**:** pp. 173.

Treanor, R. R. and S. J. Nicola (1972). A preliminary study of the commercial and sporting utilization of the bullfrog, *Rana catesbeiana* Shaw, in California. Sacramento, California, California Department of Fish and Game, Inland Fisheries Administrative Report 72-4**:** 23.

Trihey & Associates, I. (1994). Lagunitas Creek anadromous fish monitoring report, Fall, 1994. Corte Madera, California, Prepared for Marin Municipal Water District.

Trihey & Associates, I. (1996). Lagunitas Creek anadromous fish monitoring report, Fall, 1996. Corte Madera, California, Prepared for Marin Municipal Water District.

Trihey & Associates, I. (1997). Lagunitas Creek coho salmon spawner survey report, fall and winter 1996-97. Corte Madera, California, Prepared for Marin Municipal Water District.

Trumbo, J. (1994). Perennial pepperweed: A threat to wildland areas, CalEPPC Newsletter**:** 4-5.

U.S. Census Bureau (2000). Census 2000; Marin County.

U.S. Soil Conservation Service (1985). Soil Survey of Marin County, California, U.S. Department of Agriculture. Prepared in cooperation with the National Park Service and University of California Agricultural Experiment Station**:** 229.

University of California (2006). Historical Roots of Marin Agriculture, Regents of the University of California:

http://groups.ucanr.org/GIM/History_of_Marin_Agriculture/.

USDA (1995). Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook No. 701, United States Department of Agriculture, Forest Service.

USFWS (1998). California Freshwater Shrimp (Syncaris pacifica Holmes) Recovery Plan. Portland, Oregon, Prepared by U.S. Fish and Wildlife Service.

USFWS (2000). Draft Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). Portland, Oregon, U.S. Fish and Wildlife Service**:** 258.

USFWS (2005). "Endangered and Threatened Wildlife and Plants; Revised Proposed Designation of Critical Habitat for the California Red-Legged Frog (Rana aurora draytonii); 50 CFR Part 17. Proposed Rule. November 3, 2005. U.S. Fish and Wildlife Service." Federal Register **70**(212): 66906-66954.

USFWS (*in prep.*). Draft Recovery Plan for Tidal Marsh Ecosystems of Central and Northern California. Vallejo, California, Prepared by U.S. Fish and Wildlife Service.

USGS (1982). Guidelines for determining flood flow frequency. Bulletin #17B of the Hydrology Subcommittee, Interagency Advisory Committee on Water Data, U.S. Geological Survey.

USGS (1997). San Francisco Bay Region, California, Landslide Folio. Open-File Report 97-745, http://wrgis.wr.usgs.gov/open-file/of97-745/index.html.

USGS (2003a). Earthquake Hazards Program - Northern California, U.S. Geological Survey, Earthquake Hazards Program. http://quake.wr.usgs.gov/prepare/hazards.html.

USGS (2003b). Topographic surveys of Giacomini Dairy Pastures and adjacent wetland areas, Point Reyes National Seashore, Point Reyes, Marin County, California 2002-2003 (preliminary map and coverage).

USGS (2004). "Water Resources Data California Water Year 2003." Pacific Slope Basins from Arroyo Grande to Oregon State Line except Central Valley, Water Data Report CA-03-2 **2**.

van der Lee, G. E. M., H. Olde Venterink, et al. (2004). "Nutrient retention in floodplains of the Rhine distributaries in The Netherlands." River Research and Applications **20**(3): 315-325.

van Heertum, R. (2002). European Green Crab (*Carcinus maenas*). Introduced Species Summary Project. J. A. Danoff-Burg. Columbia University. http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/Carcinus_maenas.htm.

Velicogna, I. and J. Wahr (2006). "Measurements of Time-Variable Gravity Show Mass Loss in Antarctica." Science **311**(5768): 1754-1756.

Waananen, A. O., J. T. Limerino, et al. (1977). Flood-Prone Areas and Land-Use Planning - Selected Examples from the San Francisco Bay Region, California, U.S. Geological Survey Professional Paper 942**:** 75.

Wahrhaftig, C. and J. R. Wagner (1972). The Geologic Setting of Tomales Bay. Tomales Bay Environmental Study. R. Corwin. Washington, D.C., The Conservation Foundation.

Wald, D. J., H. Kanamori, et al. (1993). "Source Study of the 1906 San Francisco Earthquake." Bulletin of the Seismological Society of America **83**(4): 981-1019.

Walling, D. E., B. W. Webb, et al. (1997). Sediment-associated nutrient transport in UK rivers. Freshwater contamination. Proceeding of Rabat Symposium S4, IAHS Publication. **243:** 69-80.

Wang, J. C. S. (1982). Early life history and protection of the tidewater goby, *Eucyclogobius newberryi* (Girard), in the Rodeo Lagoon of the Golden Gate National Recreation Area, Cooperative National Park Research Study Unit, Technical Report 7, Institute of Ecology, University of California, Davis, CPSU/UCD 022/3.

Warnock, N., G. W. Page, et al. (1995). "Non-migratory movements of Dunlins on their California wintering grounds." Wilson Bulletin **107**: 131-139.

Watson, D., L. Weetman, et al. (1998). Spatial and Temporal Trace Level Monitoring Study of South San Francisco Bay. San Jose, California, City of San Jose, Environmental Services Department.

White, C. M., N. J. Clum, et al. (2002). Peregrine Falcon (*Falco peregrinus*). The Birds of North America Online. A. Poole. Ithaca, New York, Cornell Laboratory of Ornithology; Retrieved from The Birds of North American Online database: http://bna.birds.cornell.edu/BNA/account/Peregrine_Falcon/.

Whyte, D. C. and P. C. Ganguli (2000). The Impact on mercury mining on Tomales Bay biota. EPA Mercury Conference.

Whyte, D. C. and J. W. Kirchner (2000). "Assessing water quality impacts and cleanup effectiveness in streams dominated by episodic mercury discharge." Science of the Total Environment **260**: 1-9.

Winter, L. and G.E. Wallace (2006).Impacts of Feral and free-ranging cats on bird species of conservation concern.Report to the National Fish and Wildlife Foundation. http://www.abcbirds.org/cats/NFWF.pdf

Wittenkeller & Associates and Copple Foreaker & Associates (1988). Marin Pathways Study: Report & Recommendations for the Design of a Bicycle/Pedestrian/Equestrian Pathway System for the West

Shore Communities of Tomales Bay, Marin County, California, Prepared for West Marin Paths and the County of Marin.

Wolman, M. G. and J. Miller (1960). "Magnitude and frequency of forces in geomorphic processes." Journal of Geology **68**: 54-74.

Wright, A. H. and A. A. Wright (1949). Handbook of Frogs and Toads. Ithaca, New York, Comstock Publishing Associates.

Yamada, S. B. (2001). Global Invader: the European Green Crab. Corvallis, Oregon, Oregon Sea Grant.

Youd, T. L. and S. N. Hoose (1978). Historic ground failures in Northern California triggered by earthquakes, United States Geological Survey Professional Paper 993.

Intentionally Left Blank

INDEX

1906 Drainage, viii, 43, 53, 65, 77, 88, 94, 188, 196, 197, 199, 202, 214, 220, 221, 227, 248, 250, 286, 305, 341, 516, 528, 539, 610, 664, 665, 668, 717
1906 Earthquake, xxvii, 153
3rd Street, 53, 55, 66, 633, 635, 724, 726

A

ADA-Compliant, xxi, xxv, 45, 53, 55, 66, 80, 89, 632, 635, 637, 640, 643
Agricultural Production Zone, xxvii, 110, 144, 151, 361, 362, 363, 364, 366, 367, 368
Agriculture, 110, 143, 150, 151, 169, 230, 357, 363, 364, 370, 680, 684, 706
Alluvial Fan, xl, xliii, 158, 166, 168, 192, 196, 197, 203, 207, 213, 214, 305, 319, 608
Alternative Transportation, 133, 148, 325, 616, 617, 722
Ammonia, 220, 224, 456
Antiquities Act, 297, 565, 566
Army Corps of Engineers, 15, 215, 241, 682, 686, 692, 722
Arroyo Olemus Lake, 194, 233, 467
Audubon Canyon Ranch, i, xviii, 1, 7, 13, 34, 36, 51, 75, 87, 104, 138, 142, 144, 195, 268, 364, 379, 390, 679, 680, 681, 688, 690, 692, 712

B

Bank Swallow, 293
Bay Area Air Basin, 175, 176, 394, 395, 397, 398, 399, 402, 403, 404, 406, 407, 408, 409
Bear Valley Creek, 1, 5, 6, 9, 21, 32, 34, 75, 76, 77, 78, 81, 88, 92, 94, 97, 98, 104, 106, 121, 125, 139, 153, 155, 158, 160, 164, 166, 168, 175, 188, 191, 192, 194-196, 201, 202, 207, 208, 221, 223, 227, 230, 233, 235, 236, 237, 242, 245, 247, 248, 250-252, 268, 278, 279, 289, 302, 303, 305, 312, 326, 330, 331, 336, 350, 374, 376, 378, 379, 385, 386, 390, 391, 392, 416, 427, 432, 439, 440, 442, 444, 451, 453, 456, 461-466, 483, 489, 491, 492, 494, 496, 518, 522, 530, 541, 546-553, 555-559, 561, 562, 570, 573, 578, 580-582, 591, 592, 596, 598, 600, 603-606, 654, 667, 669, 672, 706, 709, 712, 726
Bear Valley Culvert, 76
Best Management Practices, 22, 98, 348, 408, 409, 417, 418, 423, 425, 471, 504, 674-676, 686, 697, 698, 704
Bicycle, 18, 148, 326, 328, 332, 616, 617, 619, 626, 680, 681, 684, 692, 717
Boardwalk, 27, 55, 58, 66, 78, 637
Bridge, 34, 53, 66, 76, 78, 81, 88, 95, 96, 97, 135, 139, 161, 188, 193, 205, 210, 269, 271, 282, 291, 293, 312, 322, 331, 456, 624, 625, 629, 632, 635, 639-643, 685, 698, 699, 704, 711, 717, 721, 725

C

C Street, viii, xiv, xviii, xxii, xxvi, xxx, xlv, xlvi, li, 7, 32, 36, 37, 43, 53, 55, 57, 58, 65, 66, 69, 70, 77, 78, 81, 82, 88, 89, 92, 133-135, 144, 147, 323, 324, 331, 332, 337, 338, 350, 357, 402, 404, 405, 408, 414-419, 421-424, 569, 618-626, 633, 635, 639, 640-644, 646-648, 651, 653, 655, 656, 659, 676, 677, 681, 700, 703, 708, 715, 719, 720, 724, 727, 730
CAA, *see Clean Air Act*
California Air Resources Board, xxviii, 176, 394
California Black Rail, xxxiv, xxxv, xxxvii, xlvi, 37, 56, 97, 127, 266, 267, 273, 274, 275, 279, 282, 289-291, 295, 325, 331, 508, 512-514, 519-521, 523, 524, 526, 531-538, 541- 546, 548, 553, 556-560, 563-565, 631, 634, 637, 638, 714, 717, 721
California Department of Health Services, xli, 12, 181, 311, 409, 594, 701
California Environmental Quality Act, i, vii, xxix, xxx, xxxii, xlii, xlix, l, li, 1, 17, 19, 27, 35, 38, 114, 115, 119, 131, 136, , 137, 169, 171, 215, 253, 298, 312, 320, 343-346, 348, 349, 353, 354, 361, 362, 365, 366, 369, 370, 381, 394-399, 407-411, 413, 414, 417, 419-421, 423-425, 468, 473, 479, 482-485, 488, 489, 500, 566, 571, 572, 583, 594, 597, 603-607, 612, 613, 627, 629, 630, 657, 670, 674, 675, 679, 688, 695-697, 702, 724, 729, 73
California Natural Diversity Database (CNDDB), 230, 252
California State Lands Commission, i, vi, viii, xiv, xvii, xviii, xxi, xxv, xliii, li-liii, 1, 10-13, 16, 17, 19, 20, 25, 27-32, 34, 35, 43-45, 48, 53, 57, 58, 62, 66, 68, 69, 70, 74-78, 80, 81, 86, 87, 89, 91, 92, 95-100, 102, 103, 104, 181, 346, 352, 372, 379, 390, 408, 409, 411, 418, 551, 586, 604, 605, 607, 621, 624, 675, 679, 680, 682, 683-685, 687, 688, 690, 691, 695, 698, 729, 730
California Red-legged Frog, vi, xxxiv, xxxv, 12, 13, 20, 23, 28, 37, 62, 75, 88, 93, 94, 97, 100, 123, 124, 266, 267, 271, 273-275, 277, 278, 282, 285, 286, 295, 296, 379, 437, 439, 441, 444, 447, 458,

493, 498, 505, 510, 512-516, 520-523, 525-529, 533-535, 538-540, 543-546, 548-551, 554-558, 560, 562, 563, 565, 588, 592, 594, 684, 700, 713
CalTrans, vi-viii, xxvi, xlix, l, lii, 2, 7, 8, 25, 28, 38, 43, 45, 141, 333, 341, 352, 356, 374, 384, 386, 401, 402, 411, 413, 414, 416, 430, 454, 474, 477, 478, 511, 567, 585, 609, 617, 631, 644, 658, 663-665, 667, 670, 672, 673, 677, 679, 680, 694, 707, 710, 715, 730
CARB, *see California Air Resources Board*
Carbon Monoxide, 114, 177, 395, 396, 397, 399
CEQA, *see California Environmental Quality Act*
Chinook salmon, xxxvi, 266, 280, 287, 289, 507, 518, 530, 533, 534, 536, 541, 543, 544, 545, 552, 556, 559, 562, 563, 565, 687
Chlorides, xli, xlii, 12, 130, 177, 312- 317, 594, 596, 598, 599, 601-606, 701
Clapper Rail, xxxvii, 127, 290, 511
Clean Air Act, xxviii, xxix, 175, 176, 393, 394, 688
Clean Water Act, v, xxxi, 2, 6, 9, 13, 15, 17, 22, 106, 172, 214, 215, 229, 241-243, 262, 270, 381, 446, 447, 467, 469, 481, 487, 494, 500, 686, 688
Coast Guard, xxvi, xli, xlii, 24, 34, 141, 188, 189, 309, 311-318, 351, 352, 595, 596-606, 675, 676, 692, 701
Coast Guard Wells, xlii, 188, 312, 317, 595, 596, 598, 599, 601, 602
Coastal Commission, xxxii, 7, 15, 18, 28, 38, 43, 141, 147, 241, 270, 356, 467, 679, 682, 685, 686, 689, 692, 694, 732
Coastal Zone, xxvi, 15, 17, 18, 109, 110, 142, 147, 150, 151, 161, 181, 229, 245, 250, 270, 320, 328, 333, 352, 354, 356, 360, 363, 364, 467, 470, 613, 626, 686, 687, 688, 689
Coho Salmon, xxxvi, 271
Community Plan, xxvi, xxxii, xlv, l, 11, 13, 18, 21, 107, 119, 141, 143, 149, 151, 161, 181, 215, 250, 251, 262, 270, 320, 324, 328, 352-355, 357, 358, 359, 360, 361-363, 369, 427, 447, 448, 467, 470, 481, 482, 485, 487, 489, 500, 503, 566, 613-617, 619, 626-628, 630, 674, 698, 699, 708, 717, 722, 728
Congestion Management Agency, xliv, 320, 612
Construction, viii, xiv, xvii, xxi, xxv, xxx, xxxv, xxxvii, xlv, xlvii, l, 16, 17, 22, 45, 56, 57, 68, 69, 80, 81, 91, 92, 94, 98, 100-102, 107, 113-115, 117-121, 123-125, 127, 130, 132- 136, 139, 191, 194, 200, 203, 204, 308, 685-687, 689, 694, 698, 713, 716, 722, 726, 727
Contaminants, 113, 171, 173, 382, 383, 385, 388, 391, 392, 396
County of Marin, xi, xxii, xxv, xlv, xlvii, 1, 17, 25, 30, 31, 34, 55, 66, 76, 78, 80, 82, 89, 94, 95, 96, 97, 104, 105, 142, 143, 148, 149, 168, 178, 195, 245, 270, 300, 318, 319, 325, 328, 329, 345, 350-352, 398, 399, 402, 410, 411, 414-416, 434, 437, 453, 465, 522, 607, 619, 621, 624, 625, 627, 629, 634, 636, 638, 640, 642, 644, 678, 679, 681, 685, 688, 689, 697, 698, 702, 710, 712, 714, 717, 718, 719, 724-726, 731; *see also Marin County*
Critical Habitat, xxxvi, 16, 262, 270, 271, 285, 287, 290, 345, 468, 500, 501, 505, 687
CSLC, *see California State Lands Commission*
Cultural Landscapes, 128, 298, 299, 566, 567
Culverts, xxi, xxii, 48, 56, 76, 85, 88, 188, 195, 549
CWA, *see Clean Water Act*

D

Dairy, viii, xxii, 7, 8, 23, 26, 32, 34, 39, 44, 51-53, 55-57, 65, 66, 69, 77, 78, 81, 82, 86, 88, 92, 104, 139, 140, 144, 156, 196, 200, 212, 274, 299, 319, 323, 324, 338, 364, 384, 387, 401, 403, 416, 419, 457, 462, 619, 633, 634, 635, 644, 647
Dairy Mesa, xxii, 51-53, 55, 56, 66, 78, 82, 86, 200, 324, 633, 635
Decomposition, 450, 463, 547
Degradation, 94, 514
Diked Brackish Marsh, 109, 232, 238, 474, 475, 476, 646
Dissolved Oxygen, 220
Downey Well, xli, 36, 38, 39, 188, 197, 311, 316, 317, 365, 598, 599, 600, 601, 602, 709
Dredging, 188

E

E. coli, 225, 452, 453, 456, 459
Earthquake, 95, 98, 139, 160, 161, 163, 164, 369
Eastern Perimeter Trail, xxxii, xxxviii, xlv, xlvi, l, 56, 57, 66, 68, 108, 118, 119, 128, 377, 380, 404, 405, 408, 418-423, 434, 439, 444, 455, 458, 461, 481-483, 485, 487-490, 494, 525, 526, 529, 530, 532, 533, 535, 537, 540, 543, 544, 548, 549, 554, 556, 558, 559, 561, 564, 568,

570, 581, 591, 615, 620-626, 630, 633-642, 644, 650, 653-656, 660, 665-669, 672, 674, 683, 699, 707, 710, 721, 722, 723, 729
Education, 691
Emergency Vehicle Access, 324
Endangered Species Act, vii, 13, 15, 16, 17, 45, 56, 68, 80, 91, 99, 229, 253, 262, 289, 292, 467, 471, 472, 500-502, 504-509, 687-689, 731
Environmentally Preferred Alternative, vii, 103, 104, 685
Erosion, 219
ESA, *see Endangered Species Act*
Essential Fish Habitat, 16, 262, 271, 500, 501, 687
Estuarine Sediment Transport, 203
Exhibits, xiv, xvii, xxi, xxv, 53, 56, 68, 80, 91

F

Facilities, vii, xxv, 27, 33, 56, 66, 80, 89, 91, 133, 134, 143, 331, 353, 429, 629, 630, 632, 636, 638, 641, 643
Farmland, xxvi, 21, 150, 169, 171, 360, 361, 365, 381
Farmland of Local Importance, 21, 169, 171
Farmland of Statewide Importance, 21, 169, 171, 365
Farmland Protection Policy Act, xxvi, 150, 169, 360, 381
Fault Trace, 77, 239, 372
Fecal Coliform, 22, 214-216, 218, 220, 224-228, 309, 384, 387, 447, 450, 452, 453, 455-461, 464-466
Fence, 48, 53, 58, 63, 64, 66, 70, 74, 78, 82, 86, 87, 89
Fish and Game, 17, 229, 253, 352, 467, 682, 685, 689, 692, 698, 729
Fish and Wildlife Service, 16, 39, 53, 66, 78, 88, 253, 262, 352, 467, 471, 472, 680, 682, 687, 692
Fish Hatchery Creek, viii, xiv, xxxvii, xl, l, 32, 36, 37, 43, 53, 58, 61, 62, 64, 65, 69, 77, 81, 88, 91, 125, 126, 185, 188-191, 196, 197, 201, 202, 206, 208, 212, 214, 219-223, 227, 228, 236, 237, 240, 242, 243, 247, 248, 250, 252, 268, 270, 277, 282, 284, 286, 289, 305, 324, 341, 389, 391, 427, 430-434, 436, 439, 441, 444, 451, 452, 455, 456, 459, 463, 476, 480, 482, 483, 484, 485-, 489, 491, 495, 513-518, 525, 528-530, 536-541, 543-545, 549-556, 559, 561, 562, 573, 576, 579, 581, 582, 590, 592, 594, 609-611, 649, 651, 652, 664, 665, 668, 674, 705, 706, 709, 714, 715
Flooding, xxxix, 36, 129, 197, 199, 208, 300-304, 308, 378, 380, 426, 431, 571-573, 585, 587, 683, 685, 703-705
Floodwater Retention, 116, 427, 429, 431, 437, 441, 445
Forested Riparian, 230, 232, 236, 237, 245, 268, 277, 278, 469, 477, 486, 491
Freshwater Marsh, iv, xiv, xviii, xxv, xxxii-xxxv, xlvii, 1, 6, 9, 10, 23, 30-32, 37, 43, 62, 63, 73, 75, 85-87, 93, 94, 123, 124, 127, 135, 168, 173, 174, 189, 191, 193, 197, 199, 202, 213, 214, 230, 232, 233, 235, 236, 242, 243, 247, 252-254, 259, 264, 267, 268-270, 274, 277, 278, 282, 286, 289, 293, 295, 304, 309, 337, 391, 431, 433, 437, 439, 441, 444, 451, 458, 460, 464, 469, 474-477, 479- 481, 484-487, 489-494, 496-499, 501, 505, 512-516, 519-522, 525-529, 531-545, 547-550, 553, 554, 555, 557, 558, 560-562, 564, 565, 586, 587-589, 592-594, 646, 648, 649, 653-655, 669 , 679, 700, 713, 715, 716
FWS, *see Fish and Wildlife Service*

G

Gallagher Well, xli, xliii, l, 311, 314, 604, 605, 606, 675, 676, 701
Golden Gate Biosphere Reserve, 6, 25, 261
Grazing, viii, 44, 169, 171, 237, 277, 384, 475, 480, 484, 525
Green Bridge, xxii, xxx, xlii, xlv, xlvi, xlvii, 5, 30, 34, 37, 43, 44, 53, 55, 66, 78, 82, 89, 96, 105, 133, 134, 139, 144, 147, 160, 174, 186, 188, 189, 193, 196, 199, 200, 205, 206, 210, 211, 216, 220, 221, 223, 226-228, 236, 243, 245, 248, 269, 279, 281, 291, 296, 303, 312-314, 322, 324, 327, 329, 331, 332, 337, 353, 422-424, 447, 452, 453, 455, 456, 526, 549, 561, 577, 579, 598, 600-602, 618, 623, 625, 629, 631-636, 638-643, 654, 698, 699, 700, 702, 704, 705, 707, 709, 717-721, 724-726, 728, 731
Green Bridge County park, xxx, xlvii, 34, 37, 44, 55, 66, 78, 89, 133, 200, 625, 629, 632, 635, 636, 638, 641, 643, 698, 699, 702, 705, 718-721, 724-726, 728, 731
Groundwater, xlvii, 190, 191, 196, 198, 200, 213, 233, 240, 242, 269, 284, 314, 336, 440, 444, 683

H

High Value Wildlife Habitat, xxxiii, xxxiv, 120, 121, 266, 267, 501, 503, 510- 512,

514, 522-524, 527, 535- 538, 544-547, 549, 555-561, 564
Historic structures, 340
Humboldt Bay owl's-clover, xxxii, 240, 254, 256, 477, 482, 488, 495

I

Invasive Species, 39, 51, 61, 63, 64, 70, 74, 75, 85, 86, 87
Inverness Park, xi, xiv, xvii, xxi, xxii, xxvii, xxxviii-xli, xlv-xlvii, 1, 17, 24, 25, 30-32, 34, 37, 43, 53, 55-57, 65, 66, 69, 77, 78, 80, 82, 88, 89, 95, 96, 104, 105, 107, 115, 119, 129, 133, 138, 144, 147, 148, 150, 180, 186, 192, 200, 236, 267, 268, 270, 281, 299, 305, 309, 311, 312, 319, 320, 322-325, 336, 337, 349, 350, 357, 358, 375, 377, 378, 380, 402, 404, 405, 408, 410, 414, 416- 419, 421-423, 434, 436, 437, 439, 454, 458, 461, 479, 481, 487, 490, 494, 523, 525, 532, 533, 536, 537, 543, 544, 556, 559, 564, 572, 573, 575-582, 604, 606, 607, 613, 618, 620-625, 634, 635, 636, 638, 640, 642, 644, 650, 654, 661, 680-683, 699, 705, 706, 717, 718, 720, 724, 725, 726, 727, 731
Inverness Ridge, xxxi, xxxiv, xl, xliii, xlvii, xlviii, 32, 36, 43, 94, 152, 153, 155, 158, 164, 166, 168, 180, 184, 193, 194, 195, 196, 197, 199, 206, 207, 213, 214, 220, 228, 229, 233, 235, 236, 238, 242, 243, 247, 264, 267, 268, 270, 273, 278, 296, 302, 303, 305, 319, 322, 323, 336-339, 390, 391, 401, 402, 406, 431, 433, 434, 437-440, 451, 452, 455, 458, 459, 463, 464, 474, 476, 486, 491, 492, 516, 528, 537, 539, 547, 550, 573, 576, 578, 580, 582, 589, 608, 610, 637, 646, 649, 651, 652, 654, 692, 705, 706
Irrigation, 36, 44, 198, 212

J

Jurisdictional Waters, 243
Jurisdictional Wetlands, 243

L

Landfill, 39, 48, 64, 614, 618, 620, 622, 625
Landslides, 164
LCP, *see Local Coastal Program*
Lease, 43, 53, 66, 78, 89
Levee, iv, viii, xi, xiv, xvii, xviii, xxi, xxii, xxvi, xxx, xxxi, xxxvii, xxxix, xliii, xliv, xlvi, xlvii, l, 5, 6, 12, 30, 34, 43, 45, 46, 48, 51, 57, 58, 61, 64, 69, 70, 73-78, 81, 82, 85, 87-89, 92, 94, 96-98, 104-106, 112, 116, 117, 120, 129, 131-133, 139, 144, 147, 156, 158, 160, 166, 168, 180, 188, 191, 192, 194, 195, 196, 200, 201, 207, 233, 236, 239, 243, 252, 279, 296, 302-305, 312, 321, 322, 324, 325, 326, 328, 329, 336, 337, 350, 378, 379, 389, 390, 393, 410, 414, 416-419, 422-424, 431-433, 435, 440, 442, 462, 463, 465, 485, 491-494, 512, 518, 526, 530, 541, 547, 549, 552, 558, 561, 572, 573, 575- 583, 603-607, 613, 618-626, 631-633, 635, 639, 642, 643, 646, 647, 649, 654, 661, 668, 675, 676, 679-681, 698, 701, 705, 706, 708, 711, 712, 714, 717, 720, 724, 725, 728
Levee Road, iv, viii, xiv, xviii, xxi, xxii, xxvi, xxx, xxxi, xxxvii, xxxix, xliii, xliv, xlvii, l, 5, 6, 12, 30, 34, 45, 46, 57, 58, 69, 70, 75-78, 81, 82, 88, 89, 92, 94, 96, 97, 104-106, 129, 132, 350, 378, 379, 390, 393, 410, 414, 416- 419, 422-424, 431-433, 435, 440, 442, 462, 463, 465, 491-494, 512, 518, 526, 530, 541, 547, 549, 552, 561, 572, 573, 575-583, 603-607, 613, 618-626, 631-633, 635, 639, 642, 643, 649, 654, 661, 675, 676, 679-681, 698, 701, 705, 706, 708, 711, 712, 714, 717, 720, 724, 725, 728
Level of Service (LOS), 321, 396, 613
Liquefaction, 111, 139, 144, 147, 156, 158, 160, 166, 168, 180, 188, 191, 192, 194, 195, 200, 201, 207, 233, 236, 239, 243, 252, 296, 302-305, 312, 321, 322, 324-326, 328, 329, 336, 372, 373
Local Coastal Program, xxvi, xxvii, xxxii, l, 13, 15, 17, 21, 107, 112, 119, 141, 142, 147-150, 161, 181, 229, 250, 251, 262, 270, 320, 322, 324, 328, 333, 336, 352-354, 356-358, 360-364, 366-369, 371-373, 375, 378, 380, 427, 467, 469-472, 481-483, 485, 487, 489, 500-509, 566, 571, 572, 613-615, 617, 619, 626-628, 644, 674, 686, 687, 689, 717, 722
Low Salinity Zone, 264, 273

M

Marin County, vi, xxvi, xxix, xl, xli, xliii-xlv, xlviii, lii, 1, 2, 7, 11, 13, 17, 18, 21, 25, 26, 32, 103, 138-144, 147-152, 161, 164, 166, 169, 171, 178-181, 215, 217, 228, 233, 245, 250, 253, 254, 258, 260-262, 280, 285, 287, 297, 301-303, 307, 309, 312, 317, 318-320, 322, 324-329, 331-334, 339, 345, 349, 350, 352, 353, 355, 356-361, 363, 369, 370, 374, 384, 386, 392, 401, 409- 411, 414, 430, 468,

470, 474, 482, 489, 500, 511, 522, 523, 536, 545, 567, 575, 582-585, 594, 607-609, 612, 613, 616, 617, 619, 623, 626, 629, 631, 632, 635, 639, 641, 644, 657, 658, 663, 670, 671, 677, 680-682, 684, 689, 692, 693, 712, 717, 722, 731; *see also County of Marin*
Marin County Zoning Ordinance, xxvi, 141, 144, 352
Marin Countywide Plan, xxvi, 13, 17, 21, 141, 142, 143, 333, 352, 355, 363, 644, 717
Marin Knotweed, xxxii, 240, 254, 256
Martinelli Ranch, xvii, xviii, xxv, xlvi, 144, 150, 196, 268, 299, 521, 533, 544, 556, 631, 716, 723
Mesa Road, viii, xiv, xvii, xviii, xxi, xxii, xxv, xxvi, xxx, xxxvii, xliv, xlv, xlvi, 18, 34, 37, 43-46, 52, 53, 56-58, 65, 66, 69, 70, 74, 77, 78, 80-82, 85, 88, 89, 91, 92, 96, 103, 107, 134, 144, 149, 174, 180, 188, 190, 195, 200, 212, 228, 248, 250, 277, 314, 323, 324, 385, 388, 410, 417-419, 421-424, 444, 445, 457, 460, 462, 466, 467, 495, 497, 498, 549, 551, 558-564, 570, 583, 587, 589, 593, 618-626, 631, 633, 634, 636, 639-643, 650, 656, 661, 669, 672, 701, 706, 713, 714, 719, 720, 722, 723
Mesic Coastal Scrub, 199, 230, 232, 240, 243, 267, 269, 277, 501, 548
Mitigation, vii, viii, xxvi, 7, 27, 28, 38, 43, 98, 106, 113-115, 119, 131, 348, 357-360, 365-368, 374, 376, 377, 379, 380, 385, 388, 389, 392, 393, 399, 401, 403, 404, 406, 408, 409, 414, 415, 418, 420, 423, 425, 432, 436, 438, 439, 443, 445, 453, 457, 460, 465, 466, 467, 473, 478, 483, 488, 496, 499, 516, 517, 520, 521, 527, 533, 534, 536, 543, 544, 555, 556, 563, 568-571, 575, 578, 580, 582, 583, 586, 588, 590, 592, 593, 597, 599, 601, 602, 604-606, 610-612, 619, 621, 622, 624-626, 632, 636, 638, 641, 643, 647, 650, 652, 655, 656, 658, 659, 660, 661, 664, 666, 668, 669, 689, 697, 700, 703, 704, 728, 731
Miwok, 138, 151, 229, 297, 298
Mosquitoes, xl, xli, 20, 24, 300, 306-309, 583-594, 700, 727

N

National Environmental Policy Act, i, vii, xxii, xxix, xxx, xxxii, xlii, l, li, 1, 14, 15, 17, 19, 27, 28, 30, 35, 38, 82, 89, 103-105, 113, 115, 119, 131, 137, 253, 297, 343-346, 348, 349, 353, 354, 361, 395-397, 399, 407, 408, 411, 413, 414, 417, 419-421, 423-425, 467, 473, 479, 482-485, 488, 489, 500, 566, 571, 572, 583, 597, 603-606, 614, 615, 630, 644, 657, 674-676, 679, 686, 688, 695-697, 720, 724, 725, 729
National Register of Historic Places, xxxix, 104, 128, 297, 298, 299, 566, 567, 568
National Wetland Inventory, 245
NEPA, *see National Environmental Policy Act*
Nicasio Reservoir, 192
Nitrates, 22, 173, 178, 214, 219-223, 228, 401, 451, 453, 455-458, 460, 461, 464, 465, 475
Nitrites, 214, 217, 220, 221, 224, 450
Nitrogen, 384, 387
Nitrogen Dioxide, xxviii, xxix, 113, 114, 175-177, 179, 394, 396-398, 401-409, 677, 688, 697
NMWD, *see North Marin Water District*
Noise, xxix, 115, 143, 179, 180, 403-407, 409, 410, 411, 413, 414, 418, 422, 425, 650, 674, 675, 698, 699, 702, 712, 719, 721, 722
North Marin Water District, vi, xli-xliii, l, lii, 12, 24, 34, 36, 38, 39, 104, 188, 193, 194, 197, 224, 309, 311-316, 351, 365, 391, 492, 595, 596, 598-602, 604-607, 675, 676, 680-683, 685, 692, 701, 708, 709
NOx, *see Nitrogen Dioxide*
Null Zone, 204, 206, 208, 227

O

Odors, 114, 396, 398, 399, 401, 403, 404, 406, 408
Old Summer Dam, xi, xvii, xxi, 30, 34, 53, 66, 78, 82, 89, 95, 105, 192, 193, 201, 202, 279, 291, 304, 315, 331, 434, 436, 437, 439, 440, 454, 458, 461, 561, 575, 576, 578, 581, 625, 654
Olema Creek, iv, xxi, xxv, xxxv-xxxvii, 75, 81, 87, 92, 123, 124, 153, 155, 164, 192-194, 196, 205, 214, 216, 225, 226, 233, 238, 243, 245, 260, 268, 280, 282, 287, 288, 291, 292, 303-305, 312, 336, 379, 395, 405, 407, 421, 493, 494, 498, 507, 518, 532, 543, 548, 550, 554, 557, 558, 562, 573, 592-594, 640, 705
Olema Lake, 194, 233
Olema Marsh, i, iv, v, vii, viii, xi, xiv, xvii, xviii, xxi, xxii, xxv-xl, xlii, xlv, xlvi-xlix-l, 1, 2, 5- 9, 13, 14, 20, 21, 23-25, 27, 28-30, 34-36, 44, 52, 55, 65, 70, 73, 75-78, 80-82, 87-89, 92-94, 96, 97, 100, 103, 104, 106, 112-114, 116-118, 120-128, 130-135, 139, 144, 147, 150, 155, 158, 160, 164, 166, 168, 169, 171, 175, 188,

191, 194, 195, 200-202, 207, 208, 219, 220-224, 226, 227, 230, 232, 233, 235-238, 241, 243, 245, 247, 248, 250, 252, 254, 261, 266, 268, 270, 273-275, 278, 282, 286, 289, 294, 296, 303, 305, 309, 312, 322, 329, 331, 336, 339, 349, 350, 353, 358, 360, 364, 366, 367, 374-380, 384-386, 388, 390-393, 395, 401, 402, 405-409, 415, 416, 419, 421-424, 430-436, 438-443, 445, 447, 449, 450- 452, 454, 455-467, 474, 477, 479, 483- 485, 489-496, 498, 499, 502, 511-513, 515, 516, 518-523, 525, 526, 528, 530-533, 536, 537, 539-542, 546-565, 567-570, 572-582, 585-594, 596, 598, 600, 601, 603-606, 610, 617, 619, 620, 622-626, 631-635, 637-643, 645, 646, 648, 649, 651-655, 658-669, 671-673, 675, 676
Overlooks, xiv, xvii, xxi, xxv, 55, 56, 66, 68, 80, 91, 108, 133, 469, 470, 576, 629, 631, 634, 635, 640, 652, 718
Oxidation, 390, 391, 462, 463
Ozone, xxviii, xxix, 175-179, 394, 395, 401-409, 688

P

Pacific Flyway, 272
Paradise Ranch Estates, xli, 309
Parking, xlv, xlvi, 20, 55, 56, 66, 80, 81, 89, 91, 101, 102, 133, 303, 320, 321, 324, 325, 329, 331, 332, 338, 613-619, 621-629, 634-636, 640, 641, 643, 681, 684, 700, 701, 704, 705, 719, 722-724
Pastures, vii, xi, xiv, xvii, xviii, xxi, xxii, xxv, xlvii, 1, 27, 32, 35, 36, 48, 52, 58, 69, 70, 81, 85, 92, 94, 100, 116, 117, 118, 120-125, 127, 130, 144, 150, 156, 158, 171, 191, 199, 201, 226, 243, 247, 269, 274, 276, 278, 294, 304, 337, 350, 359, 364, 377, 378, 380, 390, 403, 405, 407, 420, 421, 430, 434, 436, 437, 439, 441-445, 453, 457, 458, 460, 461, 466, 467, 474, 477, 482, 485, 487, 488, 489, 495, 501, 502, 513, 517, 518, 520, 526, 530, 532, 536, 538, 541-544, 546, 548, 553-555, 557, 559, 561, 564, 569, 570, 578, 581, 586, 589, 591, 593, 601, 603, 618, 622-624, 637, 638, 642, 649, 651-653, 660, 661, 666, 667, 669, 671, 672, 679, 683, 699, 701, 705, 712, 720, 722, 724, 728, 731
Pedestrian, xi, xvii, xxi, 18, 78, 325, 326, 328, 332, 614, 616, 617, 619, 626, 717
pH, xxxi, 172, 216, 219, 220-223, 390, 391, 393, 446, 450, 452, 458, 461-466, 491, 550
Phosphate, xxviii, xxxii, 219, 222, 224, 390, 391, 453, 456, 457, 459, 461, 463, 464-466, 475
Pierce Point Road, viii, xiv, xviii, xxii, xxvi, xxx, xliv, 45, 46, 57, 58, 69, 70, 81, 82, 92, 115, 132, 323, 410, 415-417, 420, 422, 424, 613, 614, 619, 620-626, 631, 633, 639
Point Reyes Mesa, iv, xxx, xxxii, xxxiv, xxxvi, xlv-xlvii, l, 7, 18, 32, 36, 56, 62, 63, 68, 127, 139, 144, 153, 155, 180, 190, 195, 196, 198-200, 212, 230, 233, 235, 236, 238, 240, 243, 247, 250, 260, 268, 269, 270, 274, 276, 277, 284, 296, 323, 328, 336-339, 357, 364, 370, 374, 376, 418, 419, 422, 424, 430, 434, 437, 440, 441, 444, 451, 452, 455, 457, 458, 461, 462, 470, 480-483, 486-488, 490, 516, 526, 530, 537, 540, 548, 551, 558, 561, 587, 589, 591, 620, 626, 634, 636, 637, 640, 643, 647, 650, 653-655, 665, 674, 681, 698, 699, 703, 708, 716, 722, 728, 729
Point Reyes Station, vi, xi, xvii, xxi, xxv, xxvi, xxx, xxxii, xxxvii, xli, xlv-xlviii, l, li, 1, 7, 11-13, 17-19, 21, 24, 25, 26, 32, 34, 36, 37, 43-45, 53, 57, 65, 66, 77, 78, 88, 89, 95- 97, 107, 115, 119, 133, 134, 138, 139, 141, 143, 144, 147, 149-151, 153, 161, 174, 179, 180, 181, 192, 194, 199, 200, 211, 215, 221, 222, 226, 228, 229, 250, 262, 268, 270, 271, 289, 303, 306, 309, 312, 314, 318-320, 322, 323-325, 326, 328, 331, 332, 336, 337, 338, 349, 350, 352, 353, 355, 357-360, 363, 369, 373, 402, 404, 405, 408, 410, 411, 415, 417-419, 421-424, 428, 451, 452, 454, 455, 460, 467, 470, 481, 482, 485, 487, 489, 500, 595, 605, 612-628, 630, 631, 633, 634, 636, 639-644, 646, 649, 650, 652, 654, 659, 674, 676, 677, 679, 681, 683, 697, 699, 700, 703, 708, 709, 715, 717, 719, 720, 722-724, 726, 727, 730, 731
Preferred Alternative xxii, 27, 70, 82, 104, 109, 120, 685, 708, 710, 711
Prime and Unique Farmland, 169, 361, 381
Public Transportation, 325

R

Railroad Grade, xxii, xxxviii, xxxix, xlvi, 18, 24, 34, 36, 37, 56, 66, 74, 80, 82, 89, 96, 97, 102, 104, 128, 149, 188, 202, 250, 299, 470, 482, 530, 552, 567, 568, 624, 634, 640, 643, 650, 681, 683, 708, 710, 717, 722, 723, 729,

Railroad Point, xiv, xvii, 34, 56, 66, 196, 199, 237, 250, 329, 461, 634, 710, 717
Regional Water Quality Control Board, v, xxviii, xxxi, xliii, lii, 1, 2, 6, 15, 17, 22, 147, 172-174, 181, 183, 209, 214, 215, 216, 218-227, 241, 242, 312, 318, 319, 219, 319, 346, 364, 366-368, 381-383, 385, 386, 388, 392, 446-448, 458, 461, 462, 481, 487, 494, 607, 608, 682, 685, 686, 688, 689, 692, 703, 711
Restoration i, vii, viii, xi, xiv, xvii, xviii, xxi-xxii, xxv, xxxii, xlii, 1-4, 8-11, 14, 27, 31, 39, 42, 43, 46, 48, 49, 52, 58, 59, 62, 70, 71, 75, 76, 82, 83, 85, 87, 88, 93, 94, 97, 98, 106, 113, 124, 127, 128, 137, 214, 247, 349-352, 390, 400, 429, 433, 436, 439, 458, 461, 469, 470, 485, 489, 494, 506, 522, 534, 539, 540, 569, 570, 578, 580-582, 589, 591, 601, 603, 610, 637, 638, 648, 660, 666, 667, 671, 679-681, 683-685, 690, 694, 707, 712, 713, 715, 716, 727, 728, 730
Revegetation, xi, xvii, xviii, xxi, xxv, 39, 43, 48, 51, 52, 58, 61, 63, 65, 70, 74, 75, 85, 87
Riparian Habitat, xxxii, xxxiii, xxxviii, xlvii, xlviii, l, li, 8-10, 18, 23, 24, 27, 39, 64, 74, 75, 87, 100, 103, 119, 121, 127, 128, 147, 149, 181, 198, 199, 208, 236, 237, 241, 248, 250, 259-264, 267, 268, 270, 273, 278, 279, 292, 329, 331, 336, 346, 361, 425, 470, 471, 476, 477-485, 487-490, 492-495, 497- 501, 509, 512, 513, 515, 516, 522, 524-526, 528, 529, 532-535, 537, 540, 542-545, 547, 548, 556, 558, 560, 564, 587, 589, 647, 649, 651, 653-655, 674, 694, 698, 699, 721-723
RWQCB, *See Regional Water Quality Control Board*

S

Safety, vi, xxvii, xxxix, xl, xlv, xlvii, 137, 143, 197, 200, 300, 307, 325, 332, 347, 371-378, 380-381, 426, 571-576, 578, 580-587, 589, 591, 617, 622, 627, 629, 630, 632, 634-638, 640, 641, 643, 644, 652, 683, 684, 695, 700, 701, 703-705, 708, 710-712, 719, 721-723, 725-727
Salinity, xlii, 22, 185, 186, 189, 191, 196, 209-212, 227, 264, 281, 285, 312, 313, 316, 383, 446, 447, 475, 505, 592, 595, 598
Salinity Intrusion, vi, xliii,12, 13, 20, 24, 28, 37, 75, 104, 131, 213, 214, 277, 286, 312-317, 346, 351, 460, 516, 528, 539, 550. 559, 595, 596, 599, 600-604, 683, 701
Salmonid, xxii, xxxiv, xxxvi, xxxvii, 12, 70, 75-77, 82, 85, 100, 125, 126, 223, 275, 279, 288-289, 507, 511, 512, 518, 519, 523, 530, 531, 533, 538, 541, 543, 545, 548, 549, 552, 553, 556, 559, 561, 562, 565, 699, 700, 713
Salt Marsh, xxxii, xlix, 1, 10, 23, 31, 44, 64, 122, 155, 156, 166, 168, 198, 209, 214, 230, 232, 238, 239, 242, 248, 252-254, 256-258, 260, 264, 269, 270, 273, 274, 278, 290, 337, 339, 375, 377, 378, 391, 474-480, 482, 484-486, 488-491, 493, 495-499, 508, 512, 513, 524, 526, 537, 550, 588-593, 637, 646, 649, 651, 652, 656, 670, 671, 716
San Andreas Fault, xxvii, 21, 34, 73, 76, 95, 152, 153, 155, 160, 161, 163, 166, 193, 194, 198, 205, 228, 239, 264, 295, 331, 336, 369, 370-372, 374-379, 477
San Francisco Bay, xlviii, xxvii, xxviii, xxxiii, 7, 21, 22, 25, 27, 51, 138, 140, 141, 153, 158, 160, 161, 163, 164, 172-176, 178, 183-185, 203, 204-206, 209, 215, 219, 237, 238, 241, 254, 257, 258-261, 271-273, 283, 285, 287, 289, 290, 291, 293, 295-297, 301-303, 306, 307, 322, 326, 327, 331, 340, 345, 349, 350, 352, 353, 382, 383, 391, 394, 446, 462, 463, 478, 484, 489, 492, 496, 502, 503, 509, 514, 527, 528, 534, 535, 545, 565, 587, 613, 664, 667, 712
Scrub Shrub Riparian, 230, 274, 281, 469, 474, 477, 491, 501, 512, 516, 523, 525, 528, 537, 540, 547, 554, 560
Sediment, viii, xxviii, 18, 43, 53, 65, 77, 88, 112, 113, 116, 171, 173, 174, 195, 202, 204-207, 210, 256, 350, 376, 381-383, 386, 389, 428, 429, 431, 432, 435, 438, 442, 445, 448, 614
Sediment Deposition, xxx, xl, 21, 51, 166, 191, 195, 203, 204, 206, 208, 209, 242, 270, 303, 375, 376, 377, 428, 429, 430, 432, 434, 435, 436, 440, 442-445, 448, 453, 575, 577, 609, 713, 714, 731,
Sediment Transport, 116, 202, 204, 210, 428, 429, 431, 432, 435, 438, 442, 445, 448
Seeps, xxxvi, 6, 22, 152, 166, 180, 196-199, 213, 221, 228, 230, 235, 242, 243, 245, 247, 248, 264, 267, 337, 452, 530, 540, 568, 591, 703
SFBAAB, xxix, 176, 394
Shallow Shorebird Habitat, 12, 296
Shorebirds, 266, 267, 275, 276, 281
Sir Francis Drake Boulevard, viii, xi, xiv, xviii, xxii, xxvi, xxx, xxxix, xl, xliv, xlvii, li, 5, 7, 12, 31, 32, 34, 37, 39, 45, 46,

55, 57, 58, 64, 68-70, 76, 81, 82, 92, 95, 104, 139, 144, 147, 148, 180, 188, 189, 191, 194, 196, 197, 199, 200, 212, 214, 223, 228, 233, 235, 239, 243, 247, 259, 268, 270, 277, 278, 286, 296, 299, 302-305, 312, 320-326, 328, 329, 331-333, 336-339, 350, 375, 377, 378, 380, 401, 402, 404, 405, 408, 410, 414-424, 431, 434, 437, 438, 439, 440, 443, 451, 460, 474, 478, 481, 487, 494, 520, 525, 532, 539, 543, 572, 573, 576, 578-582, 612-614, 618-626, 631, 633, 634, 635, 637, 639, 643, 644, 647, 648, 650-652, 654, 676, 677, 680, 681, 699, 705, 717, 720, 724, 726, 729
Sora, 266, 267
Southern Perimeter Trail, xi, xvii, xxi, 30, 31, 53, 55, 57, 66, 78, 80, 82, 89, 96, 104, 105, 108, 119, 132-134, 375-378, 380, 402, 416-425, 434, 436, 437, 439, 454, 458, 461, 479, 481, 487, 490, 494, 523, 525, 526, 532, 533, 536, 537, 543-544, 548, 556, 560, 561, 576, 578, 581, 583, 615, 619-625, 630, 633-642, 649, 650, 652, 654-656, 665, 668, 669, 694, 698-700, 704, 707, 708, 711, 717-720, 723-726
State Route 1, viii, xiv, xviii, xxii, xxvi, xxx, xliv, xlv, 2, 5, 7, 8, 32, 34, 45, 46, 57, 58, 69, 70, 78, 81, 82, 92, 134, 144, 147, 153, 180, 188, 279, 304, 312, 320, 322-324, 326, 328, 329, 332, 333, 350, 357, 384, 401, 410, 414, 415, 430, 474, 511, 567, 585, 604, 609, 612, 613, 617-620, 623, 625, 631-633, 635, 636, 639, 640-644, 658, 663, 670, 677, 683, 694, 707, 719, 720, 724
Steelhead, xxxv, xxxvi, 9, 18, 51, 100, 149, 181, 262, 266, 271-273, 276-280, 282, 284, 285, 287-289, 296, 313, 500, 501, 506, 507, 518, 530, 533, 534, 536, 541, 543-546, 548, 552, 553, 556-560, 562, 563, 565, 598, 600, 684, 687, 714, 723
Subsidence, xxvii, xxxii, 21, 27, 28, 152, 153, 155, 158, 166, 369, 376, 379, 380, 391, 435, 441, 442, 462, 464, 491, 492, 547, 550, 598, 603
Surface Fault Rupture, 111, 371, 373

T

Tidal Brackish Marsh, xxxii, xxxiii, xxxiv, xxxv, xxxvii, 232, 238, 266, 267, 268, 269, 276, 290, 469, 477, 482, 488, 490, 495, 498, 501, 512, 513, 514, 516, 520, 524, 525, 527, 537, 547-550, 557, 558, 561, 586, 646, 648
Tidal Prism, xxxviii, xliii, l, 130, 131, 183, 189, 191, 426, 430, 434, 435, 437, 441, 442, 444, 596, 600-606, 701, 703, 712
Tidal Salt Marsh, xxxiv, xxxvii, xli, 121, 232, 238, 239, 247, 252, 266, 267, 269, 270, 273, 274, 289, 469, 476, 477, 479, 480, 482, 484-486, 488, 489-491, 495, 496, 498, 501, 508, 512, 519, 523-525, 531, 536, 537, 541, 542, 546, 547, 553, 559, 563, 565, 587, 589, 591, 646, 648
Tidegates, viii, 5, 44, 51, 53, 65, 77, 88, 431, 433, 585
Tidewater Goby, iv, vi, viii, xxxv, xxxvi, 6, 12, 13, 20, 23, 28, 39, 44, 48, 51, 53, 62, 65, 66, 73, 77, 78, 88, 89, 94, 100, 124, 199, 266, 271, 273, 275-279, 281, 283-285, 430, 433, 437, 439, 444, 506, 510, 512, 514, 516, 517, 521-523, 527, 529, 530, 533, 534, 536, 537, 540, 543, 544, 545, 548, 551, 552, 555, 556, 558, 562, 563, 565, 684, 714, 723, 729
TKN, 382
Tomales Bay Trail, xiv, xvii, xxi, xxii, xxv, xlvi, xlvii, 34, 44, 56, 66, 68, 78, 80, 82, 89, 96, 133, 237, 250, 256, 258, 325, 329, 332, 336, 339, 418, 552, 559, 561, 564, 618, 620, 621, 625, 631, 634, 637, 640, 642-644, 646, 647, 650, 683, 699, 721, 722
Tomales Bay Watershed, liii, 1-3, 5-7, 11, 20, 22, 31, 39, 137, 138, 141, 152, 153, 164, 172, 185, 196, 198, 214, 219, 233, 251, 261, 283, 287, 288, 294, 318, 345, 349, 351, 428, 447-449, 454, 458, 461, 466, 467, 469, 483, 503, 506, 514, 515, 517, 523, 527-529, 535, 539, 540, 545, 549, 551, 558. 561, 564, 608, 648, 651, 653, 670-673, 684, 693, 714
Tomales Bay Watershed Council, 7, 11, 351, 454, 483, 693
Tomasini Creek, iv, viii, xiv, xviii, xxii, xxv, xxvi, xxviii, xxxi, xxxiv, xxxvi-l, 5, 6, 18, 34, 36, 39, 43, 44, 48, 51-53, 56, 61, 62, 65, 68, 73, 74, 77, 81, 82, 85-88, 91, 92, 94, 96, 103, 106, 113, 117, 123-126, 149, 155, 168, 174, 175, 188, 190, 191, 195, 196, 197, 199, 200, 202, 207, 212, 219, 220-223, 226-228, 232, 237, 240, 242, 243, 247, 248, 250, 251, 260, 269, 274-277, 282-284, 289, 291, 294, 308, 323, 329, 338, 339, 357-360, 382, 385, 386, 388, 390, 392, 393, 408, 418, 422-424, 427, 430, 431, 433, 434, 436, 437, 439-442, 444-447, 451, 452-455, 457-462, 466, 467, 478, 479, 481, 486, 488, 489, 490, 495, 497, 498, 502, 506, 513, 514, 516-521, 523, 525, 526, 529, 530-533, 535-537, 540-543, 545-56, 558-562, 564, 565, 568, 570, 573, 576,

581, 585-587, 589, 591, 593, 600, 601, 603, 626, 634, 636, 642, 653-656, 661, 664-674, 699, 706, 708, 713-715, 728, 729
Tomasini Triangle, xiv, xviii, xxv, xxxv, 62, 63, 73, 75, 85, 86, 87, 200, 212, 213, 228, 437, 441, 444, 458, 460, 486, 487, 490, 491, 494, 497-499, 536-539, 550, 557, 560, 562, 564, 565, 713, 715
Traffic, xiv, xviii, xxii, xxvi, xliv, 45, 57, 69, 81, 92, 102, 132, 133, 180, 320-322, 326, 415, 612, 614, 615, 617, 619, 622, 627, 635, 640, 642, 658, 700-702, 719, 721, 722, 726, 727
Trails, xxi, 78, 107, 143, 328, 329, 340, 577, 681, 691, 692, 718, 722, 731
Tribal Lands, 298
Turbidity, 185, 203, 210, 223

U

Undiked Marsh, xxviii, xxxvii, xxxviii, xlvii, 34, 44, 45, 56, 64, 68, 80, 91, 156, 158, 173, 183, 221, 232, 238, 240, 242, 243, 245, 247, 252, 254, 256-258, 261, 266, 270, 280, 282, 289, 290, 291, 293, 294, 309, 325, 331, 336, 349, 353, 387, 393, 439, 475, 477, 502, 509, 514, 515, 519, 520, 524, 525, 531, 536-538, 541, 542, 549, 553, 554, 561, 576, 579, 582, 587, 589, 637, 717
Upwelling, 140, 183, 184, 217, 263, 271-272
USCG, xli, 309, 314, 318, 595

V

Value Analysis, lii, 29, 97, 104, 682, 708
Viewing Areas, xiv, xvii, xxi, xxv, 53, 55, 56, 68, 80, 91
Viewsheds, xlvii, 134, 135, 333, 336, 644, 645
Visibility, 177
Visual Resources, 134, 135, 333, 336, 337, 644, 645, 702, 721

W

Water Quality, v, 6, 11, 17, 147, 208, 215, 219, 223, 311, 314, 387, 446, 450, 594, 688
Water Right, viii, 39, 53, 65, 78, 88, 188, 709
Waterfowl, 266, 267, 276, 281
West Marin Landfill, xxviii, 174, 188, 196, 276, 382, 386, 392, 393, 462, 551
West Nile Virus, xl, xli, 24, 130, 300, 306, 308, 309, 583, 584, 585, 587, 588, 589, 590, 591, 592, 594, 700
West Pasture Freshwater Marsh, 94, 277, 278; *See also Freshwater Marsh*
Wet Meadow, xxxii, 9, 10, 230, 232, 236, 245, 474, 476, 479, 481, 486, 487, 491, 494, 512, 537, 587, 589
Wet Pasture, iv, xxxii, xxxviii, 6, 23, 109, 230, 232, 235, 259, 260, 293, 509, 520, 530, 587, 589, 649
White House Pool, xi, xvii, xviii, xxi, xxii, xxv, xxxiv, xxxix, xlv, xlvi, xlvii, xlviii, 5, 31, 34, 36, 44, 51, 53, 55, 56, 61, 66, 70, 76, 78, 82, 89, 91, 94, 95, 96, 107, 134, 144, 158, 168, 169, 171, 186, 188, 189, 191, 192, 194, 196, 201, 202, 206, 208, 211, 223, 233, 236, 239, 243, 245, 248, 250, 269, 280, 281, 291, 303, 304, 313, 325, 326, 327, 329, 331, 332, 336-338, 353, 376, 380, 384, 387, 416, 424, 431, 432, 434, 437, 438, 440, 442, 454, 458, 461, 493, 526, 527, 532, 533, 535, 543-545, 549, 554, 556, 559, 561, 572, 575-577, 579, 580, 600, 603, 618, 621, 624, 625, 629, 631-,636, 638-644, 646-652, 654, 656, 679, 699, 702, 705, 712, 717-720, 723, 724, 726, 728, 731
White House Pool County park, xi, xvii, xxi, xxii, xxv, xxxix-xlviii, 44, 53, 55, 56, 66, 78, 82, 91, 107, 134, 144, 169, 171, 186, 188, 191, 243, 303, 325, 326, 329, 331, 332, 336, 338, 376, 380, 424, 434, 437, 440, 493, 526, 549, 559, 561, 572, 577, 579, 618, 621, 624, 625, 631-635, 639-644, 646-650, 652, 654, 656, 679, 702, 705, 712, 718, 720, 724, 726, 728
Wildlife Conservation Board, xxvi, 34, 94, 141, 236, 248, 250, 329, 352, 679, 719
Williamson Act, xxvi, 150, 151, 361, 363-368

X

X2, 210, 264, 273

Intentionally Left Blank

Appendices

Appendix A

Special Status Wildlife and Plant Species with Potential to Occur in Project Area

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Abronia umbellata ssp. *brevifolia*	pink sand-verbena	1B.1	Disturbed sandy areas; coastal dunes and **scrub**; <100 m.	Yes	No	Present in Seashore (PORE).	
Agrostis blasdalei	Blasdale's bent grass	*FSacSC*; 1B.2	Coastal dunes, prairie, bluffs, and **scrub**.	Yes	Yes* quarry	Known from fewer than 15 occurrences (CNPS 2007). Present in Seashore (PORE). Located adjacent to the McClure Ranch quarry area.	
Alopecurus aequalis var. *sonomensis*	Sonoma alopecurus	FE; 1B.1	**Freshwater marshes and swamps; riparian scrub; wet meadows**.	Yes	No	Known from fewer than ten occurrences (CNPS 2007). Mapped in marshy area of creek near Inverness Park in 1898, but not observed in that area since (NDDB 2007). Present in coastal areas of Seashore. Jepson does not differentiate var. *sonomensis* (Hickman 1993).	
Amorpha califonica var. napensis	Napa false indigo	FSacSLC; 1B.2	Openings in broadleaf upland forest, chaparral, and cismontane woodland.	No		Found on Mt. Tam, Bolinas and San Geronimo Valley (NDDB 2007).	
Amsinckia lunaris	bent-flowered fiddleneck	FSacSLC; 1B.2	**Coastal bluff scrub**; Cismontane woodland; **Valley and foothill grassland**	Yes	No	Occurs in several locations around the county including some near the mouth of Tomales Bay (NDDB 2007).	
Arabis blepharophylla	coast rock cress	FSacSLC; 4.3	Coastal prairie, bluffs, and **scrub**; broadleaved upland forest.	Yes	No	Present in Seashore (PORE).	
Arctostaphylos hookeri ssp. *montana*	Tamalpais manzanita	*FSacSC*, 1B.2	Serpentinite areas in chaparral and valley and foothill grassland	No		Known from fewer than 20 occurrences in the Mt. Tamalpais area (CNPS 2007).	
Arctostaphylos virgata	Marin manzanita	FSacSLC; 1B.2	Broadleafed upland forest; closed-cone coniferous forest; chaparral; North Coast coniferous forest; on sandstone or granitic soil.	No		Known from fewer than 20 occurrences (CNPS 2007). Mapped in Bishop pine forest in several locations on Inverness Ridge (NDDB 2007).	
Astragalus pycnostachyus var. *pycnostachyus*		FSacSLC; 1B.2	**Coastal marshes or seeps**; <30 m.	Yes	No	Present in Seashore (PORE).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Blennosperma nanum var. *robustum*	Point Reyes blennosperma	*FSacSC*; SR; 1B.2	Coastal prairie and **scrub**.	Yes	No	Known from fewer than 15 occurrences; some Pt. Reyes populations intermediate to *B.* var. *nanum* (CNPS 2007). Species occurs in the vicinity of the McClure Quarry, but not within the proposed hauling route.	
Boschniakia hookeri	small groundcone	2.3	North Coast coniferous forest, usually parasitic on *Gaultheria salon*.	No		Mapped on several places on Mt. Tamalpais (NDDB 2007).	
Calamagrostis crassiglumis	Thurber's reed grass	*FSacSC*; 2.1	**Mesic areas in coastal scrub and freshwater marshes**.	Yes	No	Known in California from fewer than 10 occurrences (CNPS 2007). Present in Seashore (PORE). Jepson does not differentiate from *C. stricta* ssp. *inexpansa* (Hickman 1993).	
Calochortus tiburonensis	Tiburon mariposa lily	FT, ST; 1B.1	Serpentinite areas in valley and foothill grassland.	No		Known from only one occurrence at Ring Mountain (CNPS 2007).	
Calystegia purpurata ssp. *saxicola*	morning-glory	FSacSLC; 1B.2	Rocky coastal scrub; <100 m.	No		Present in the Seashore (PORE). All known locations are west on Inverness Ridge. None occur in Tomales Bay.	
Campanula californica	swamp harebell	*FSacSC*; 1B.2	Bogs and fens; closed-cone and North Coast coniferous forest; coastal prairie; **meadows; freshwater marsh.**	Yes	No	Mapped in several locations along the western side of Tomales Bay and Inverness Ridge (NDDB 2007).	
Carex buxbaumii	sedge	4.2	**Wet places**; < 3300 m.	Yes	No	Not known from Seashore (PORE) or Tomales Bay area (NDDB 2007). J.T. Howell (1970) records it historically occured on Point Reyes Peninsula in *Marin Flora*.	
Carex leptalea	flaccid sedge	2.2	Bogs and fens; meadows; **marshes and swamps.**	Yes	No	Historically known only from Ledum Swamp in the Seashore (NDDB 2007). Apparently extirpated from Marin by wetland loss (CNPS 2007).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Carex lyngbyei	Lyngbye's sedge	2.2	**Marshes and swamps (brackish or freshwater**).	Yes	Yes	Found in Inverness, south of Inverness, and Stinson's Beach (NDDB 2007). Occurs in brackish marsh along Lagunitas Creek in Project Area and just north of the Giacomini Ranch North Levee on the west near Sir Francis Drake.	
Castilleja affinis ssp. *neglecta*	Tiburon Indian paintbrush	FE; ST; 1B.2	Serpentinite areas in valley and foothill grassland.	No		Known from six occurrences (CNPS 2007). Not known from Seashore (PORE) or Tomales Bay area (NDDB 2007).	
Castilleja ambigua ssp. *ambigua*	salt marsh owl's-clover	FSacSLC	**High marsh/upland ecotone of salt marshes.**	Yes	Yes	Potentially a species of regional significance (USFWS *in prep.*). Marsh ecotype populations have declined significantly. Occurs at Tomales Bay Trail and Limantour Marshes.	
Castilleja ambigua ssp. *humboldtiensis*	Humboldt Bay owl's-clover	*FSacSC*; 1B.2	**Coastal salt marsh. Mid-marsh.**	Yes	Yes	Known only from Humboldt and Marin counties (NDDB 2007). Reported previously as present in a few locations on western and eastern sides of Tomales Bay, including along Tomales Bay Trail. Observed outboard of Giacomini Ranch levee and in undiked marsh north of Ranch, as well.	
Ceanothus gloriosus var. *exaltatus*	glory brush	4.3	Shrubby slopes; ridges; chaparral; coniferous forest; <500 m.	No		Present in GGNRA (PORE).	
Ceanothus gloriosus var. *gloriosus*	Point Reyes ceanothus	4.3	Sandy areas in coastal bluff scrub, closed-cone coniferous forest, coastal dunes, and **coastal scrub**.	Yes	No	Present in Seashore (PORE). Species occurs in the vicinity of the McClure Quarry, but not within the proposed hauling route.	
Ceanothus gloriosus var. *porrectus*	Mount Vision ceanothus	*FSacSC*; 1B.3	Closed-cone coniferous forest; coastal prairie; **coastal scrub**; valley and foothill grassland.	Yes	No	Mapped in Bishop pine forest and in coastal prairie in several locations around Point Reyes (NDDB 2007) Known from fewer than 15 occurrences (CNPS 2007).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Ceanothus masonii	Mason's ceanothus	*FSacSC*; SR; 1B.2	Serpentinite areas in chaparral.	No		Known from approximately five occurrences; may be a variety of *C. gloriosus* (CNPS 2007). Present in GGNRA (PORE).	
Chorizanthe cuspidata var. *cuspidata*	spineflower	*FSacSC*; 1B.2	Sandy areas in coastal dunes, coastal prairie, and **coastal scrub**.	Yes	No	Present in the Seashore (PORE) north of Abbot's Lagoon (NDDB 2007). "Some plants from Point Reyes probably intermediate to var. *villosa*" (CNPS 2007). Jepson does not differentiate species into varieties (Hickman 1993).	
Chorizanthe cuspidata var. *villosa*	spineflower	FSacSC; 1B.2	Sandy areas in coastal dunes, coastal prairie, and **coastal scrub**.	Yes	No	Known from fewer than 10 occurences (CNPS 2007). Present in the Seashore (PORE) in sandy soils along the Great Beach and historically present at Dillon Beach (NDDB 2007). Jepson does not differentiate species into varieties (Hickman 1993).	
Chorizanthe robusta var. robusta	robust spineflower	FE; 1B.1	Cismontane woodland (openings); Coastal dunes; **Coastal scrub**; sandy or gravelly substrate.	Yes	Yes* quarry	Presence in the Seashore (PORE) is currently in dispute. Genetic testing found at least one population in the Seashore was actually *C. cuspidate villosa*. Status of the other populations is undetermined (*pers. comm.,* Rodgers 2007). Known from several locations from of Abbot's Lagoon to L Ranch and McClure's Ranch, one of which is along the proposed route to the McClure Ranch Quarry (NDDB 2007).	
Chorizanthe valida	Sonoma spineflower	FE; SE; 1B.1	Sandy areas in coastal prairie.	No		Thought extinct at one time; only known extant occurrence in Seashore (CNPS 2007; PORE).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Cirsium andrewsii	Franciscan thistle	1B.2	Sometimes serpentinite areas in broadleafed upland forest and coastal bluff scrub.	No		Present in Seashore (PORE).	
Cirsium hydrophilum var. *vaseyi*	Mount Tamalpais thistle	*FSacSC*; 1B.2	Serpentinite seeps in broadleafed upland forest and chaparral.	No		Known from fewer than 10 occurrences on Mt. Tamalpais (CNPS 2007).	
Clarkia concinna ssp. *raichei*	Raiche's red ribbons	*FSacSC*; 1B.1	**Coastal bluff scrub**.	Yes	No	Species known from only one occurrence in Marin County which is near Tomales (CNPS 2007).	
Collinsia corymbosa	round-headed chinese houses	1B.2	Coastal dunes.	No		Not known from Seashore (PORE) or Tomales Bay area (NDDB 2007). May not be any occurrences currently in Marin County (CNPS 2007). Howell (1970) cites its possible presence in Marin county at Bolinas Lagoon).	
Cordylanthus maritimus ssp. *palustris*	Point Reyes bird's-beak	*FSacSC*; 1B.2	**Coastal salt marsh**. Higher portions of mid marsh or high marsh.	Yes	Yes	Present in several areas on the western and eastern sides of Tomales Bay. Observed in undiked marsh at end of Tomales Bay Trail and north of Giacomini Ranch.	
Cordylanthus mollis ssp. *mollis*	soft bird's beak	FE; FX; SR; 1B.2	**Coastal salt marsh**.	Yes	No	Known from fewer than 15 occurrences. Not listed as currently occurring in Marin (CNPS 2007) and has never been observed in marshes on west coast of Marin and Sonoma counties. Currently located exclusively in San Francisco Bay and Sacramento-San Joaquin Delta.	
Delphinium bakeri	Baker's larkspur	FE; FX; SR; 1B.1	**Coastal scrub**.	Yes	No	Known from only one occurrence east of Marshall (CNPS 2007).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Delphinium luteum	Yellow larkspur	FE; FX; SR; 1B.1	Chaparral; Coastal prairie; **Coastal scrub**/rocky	Yes	No	Known from only four occurrences. Hybridizes with *D. nudicaule* (CNPS 2007). Only known populations near Valley Ford, Walker Creek, and south of town of Tomales (NDDB 2007).	
Dirca occidentalis	western leatherwood	FSacSLC; 1B.2	Broadleafed upland forest; chaparral; closed-cone and North coast coniferous forest; cismontane woodland; **riparian scrub; riparian woodland; on brushy, mesic slopes;** mostly in mixed evergreen and foothill woodland communities.	Yes	No	Mapped along Nicasio Creek, Devils Gulch and Inverness Ridge (NDDB 2007).	
Elymus californicus	California bottle-brush grass	4.3	North coast coniferous forest.	No		Present in Seashore (PORE).	
Erigeron supplex	supple daisy	*FSacSC*; 1B.2	**Coastal bluff scrub**; coastal prairie.	Yes	No	Last known occurrence in the Seashore from 1900 near Drakes Bay. Site searched in 1983 without success. Probably extirpated (NDDB 2007).	
Eriogonum luteolum var caninum	Tiburon buckwheat	FSacSLC; 3.2	Chaparral; Coastal prairie; **Valley and foothill grassland**/ serpentinite	Yes	No	Not known from Seashore. Mapped at Carson Ridge and Tiburon (NDDB 2007).	
Erysimum franciscanum	San Francisco wallflower	*FSacSC*; 4.2	Coastal dunes; **coastal scrub**; often serpentinite or granitic areas in valley and foothill grassland.	Yes	No	Not known from Seashore (PORE) or Tomales Bay area (NDDB 2007).	
Fritillaria. *affinis var. tristulis*	fritillary	FSacSC; 1B.1	Coastal bluff scrub; **coastal scrub**; coastal prairie; in canyon, riparian, and rock outcrop areas; often on serpentine.	Yes	No	Endemic to Marin County. Mapped in several locations in Seashore (PORE) west of Inverness Ridge and near Bolinas (NDDB 2007). Known from fewer than 15 extant occurrences (CNPS 2007). This variety currently not recognized by Jepson Manual (June 2004).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Fritillaria liliacea	fragrant fritillary	*FSacSC*; 1B.2	Often on serpentinite soils in coastal scrub, coastal prairie, and **valley and foothill grassland**.	Yes	Yes *Adjacent to Study Area*	Previously mapped near Nicasio Reservoir, Limantour, and east side of Tomales Bay at the eastern end of Tomales Bay Trail (NDDB 2007).	
Gilia capitata ssp. *chamissonis*	dune gilia	FSacSC; 1B.1	Coastal sandhills; <60 m.	No		Present in Seashore (PORE).	
Gilia capitata ssp. *tomentosa*	woolly-headed gilia	FSacSC; 1B.1	Rocky outcrops on **coastal bluff scrub**.	Yes	No	Known from only three occurrences near Tomales and Salt Point SP. Last known occurrence in Seashore in 1934. Known from several locations along the east side of Tomales Bay along Highway 1. Intergrades with *G. capitata* ssp. *capitata* (NDDB 2007).	
Gilia millefoliata		FSacSLC; 1B.1	Stabilized coastal dunes; <10 m.	No		Found in several locations in the Seashore (PORE) between Drakes Bay and the Great Beach.	
Grindelia hirsutula var. *maritima*	San Francisco gumplant	*FSacSC*; 1B.2	Sandy, serpentinite soils in coastal bluff scrub, **coastal scrub**, and **valley and foothill grassland**.	Yes	No	Present in Seashore (PORE).	
Hemizonia congesta ssp. *leucocephala*	hayfield tarplant	3	**Coastal scrub**; **valley and foothill grassland.**	Yes	No	Present in Seashore (PORE). Intergrades with *H. congesta* ssp. *congesta* (CNPS 2007) and listed by Jepson Manual as synonym for that species.	
Hesperevax sparsiflora var. *brevifolia*	short-leaved evax	FSacSC; 2.2	**Coastal bluff scrub**; coastal dunes.	Yes	No	Present in Seashore (PORE).	
Hesperolinon congestum	Marin dwarf flax	FT; ST; 1B.1	Serpentinite areas in chaparral and valley and foothill grassland.	No		Present in GGNRA (PORE). Known from fewer than 20 occurrences (CNPS 2007).	
Holocarpha macradenia	Santa Cruz tarplant	FT; SE; 1B.1	Often clay soils in coastal prairie and **valley and foothill grassland**.	Yes	No	Last remaining population in San Francisco Bay extirpated in 1993 (CNPS 2007).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Horkelia cuneata ssp. *sericea*	Kellogg's horkelia	*FSacSC*; 1B.1	Old dunes; coastal sandhills; gen < 200 m.	No		Historically present at Abbots Lagoon, but not seen since 1935 (NDDB 2007). Occurrence from Mt. Bruno area probably last remaining one in San Francisco Bay (CNPS 2007).	
Horkelia marinensis	Point Reyes horkelia	*FSacSC*; 1B.2	Coastal dunes, prairie, and **scrub**.	Yes	No	Present in Seashore (PORE). Known from fewer than 20 occurrences (CNPS 2007).	
Horkelia tenuiloba	thin-lobed horkelia	FSacSLC; 1B.2	Broadleafed upland forest; chaparral; **valley and foothill grassland**/mesic openings, sandy	Yes	No	Species located on the east side of Bolinas Ridge and on Mt. Tamalpais (CNDB 2005).	
Lasthenia macrantha ssp. bakeri	Baker's goldfields	1B.2	Closed-cone coniferous forest, **coastal scrub**, **meadows and seeps**, **marshes and swamp**.	Yes	No	Plants from the Seashore may be this subspecies, but need verification (CNPS 2007)	
Lasthenia macrantha ssp. *macrantha*	goldfields	FSacSLC; 1B.2	Grasslands and dunes along immediate coast; <500 m.	No		Present in Seashore (PORE).	
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	*FSacSC*; 1B.2	**Freshwater and brackish marsh**.	Yes	No	Species located exclusively in San Francisco Bay and Sacramento-San Joaquin Delta. Has never been observed in marshes on west coast of Marin and Sonoma counties. Not listed as occurring in Marin County (CNPS 2007). Specimen from 1892 collected in "Tamalpais Region" in the University Herbarium at UC Berkeley.	
Layia carnosa	beach layia	FE; SE; 1B.1	Coastal dunes.	No		Present in Seashore (PORE).	
Leptosiphon grandiflorus (=*Linanthus grandiflorus)*	large-flower linanthus	FSacSLC; 4.2	Coastal bluff scrub; closed-cone coniferous forest; cismontane woodland; coastal dunes; coastal prairie; **coastal scrub**; and **valley and foothill grassland**.	Yes	No	Present in Seashore (PORE). Species occurs in the vicinity of the McClure Quarry, but not within the proposed hauling route.	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Leptosiphon rosaceus (=*Linanthus rosaceus)*	rosy linanthus	FSacS C;1B.1	**Coastal bluff scrub**	Yes	No	Present in Seashore (PORE). Occurs along ocean facing coastal bluffs in the Seashore along the Great Beach, Tomales Point, and Chimney Rock.	
Lessingia hololeuca	woolly-headed lessingia	3	Broadleafed upland forest; coastal scrub; lower montane coniferous forest; **valley and foothill grassland /clay**, serpentinite	Yes	No	Mapped in east and northern Marin at Tiburon, Ignacio, and Chileno Valley areas (CNPS 2007).	
Lessingia micradenia var. *micradenia*	Tamalpais lessingia	*FSacS C*; 1B.2	Usually serpentinite areas in chaparral and valley and foothill grassland; often along roadsides.	No		Known only from Mt. Tamalpais (CNPS 2007),	
Lilaeopsis masonii	Mason's lileaopsis	*FSacS C*; SR; 1B.1	**Freshwater and brackish marshes; riparian scrub**; in muddy or silty soil formed through river deposition.	Yes	No	Questionable identification of species in 1939. May have been *L. occidentalis*. Hydrology of site since altered. Presumed extirpated (NDDB 2007).	
Lilium maritimum	coast lily	*FSacS C*; 1B.1	Broadleafed upland forest; closed-cone coniferous forest; coastal prairie; **coastal scrub**; and North coast coniferous forest.	Yes	No	Present in only one location in Marin County within the Seashore near Bull Point (PORE).	
Limnanthes douglasii ssp. *sulphurea*	Point Reyes meadowfoam	SE; 1B.2	Coastal prairie; mesic areas in meadows; **freshwater marsh**; and vernal pools.	Yes	No	Known from fewer than 15 occurrences (CNPS 2007). Present in Seashore (PORE).	
Limosella subulata	Delta mudwort	2.1	**Marshes and swamps**.	Yes	No	Known in California from occurrences in the Sacramento-San Joaquin Delta; occurrence from PORE needs verification (CNPS 2007). Jepson classifies as native of eastern coast of North America and Europe (Hickman 1993).	
Lupinus tidestromii	Tidestrom's lupine	FE; SE; 1B.1	Coastal dunes.	No	No	Present in Seashore (PORE).	
Micropus amphibolus	Mt. Diablo cottonweed	3.2	Broadleafed upland forest; chaparral; cismontane woodland; **valley and foothill grassland**/ rocky	Yes	No	Known from several sites in east Marin. Not known from the Seashore (PORE).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Microseris paludosa		FSacSL C; 1B.2	**Moist grassland** or open woods; < 300 m.	Yes	No	Present in Seashore (PORE).	
Monardella undulata	curly-leaved monardella	FSacS C; 4.2	Chaparral; coastal dunes; **coastal scrub**; ponderosa pine sandhills in lower montane coniferous forest.	Yes	No	Present in Seashore (PORE).	
Navarretia rosulata	Marin County navarretia	FSacSL C; 1B.2	Closed-cone coniferous forest; chaparral / serpentinite, rocky	No		Known from fewer than 20 occurrences. Found on Mt. Tamalpais and in Marin Municipal Water District lands (NDDB 2007). Not known from Seashore.	
Pentachaeta bellidiflora	white-rayed pentachaeta	FE; SE; 1B.1	Often serpentinite areas in valley and foothill grassland.	No		Known from only one extended occurrence near Highway 280 on San Francisco Peninsula and one occurrence in Santa Lucia Mountains (CNPS 2007). Historically found in Marin, but not known from the Seashore (PORE) or Tomales Bay area (NDDB 2007).	
Perideridia gairdneri ssp. *gairdneri*	Gairdner's yampah	*FSacS C*; 4.2	Mesic areas in broadleafed upland forest, chaparral, **valley and foothill grassland**, and vernal pools.	Yes	No	Present in Seashore (PORE).	
Phacelia insularis var. *continentis*	northcoast phacelia	*FSacS C*; 1B.2	**Coastal bluff scrub**; coastal dunes.	Yes	No	Known from fewer than 10 occurrences (CNPS 2007). Present in Seashore (PORE).	
Piperia elegans ssp. *decurtata*	Point Reyes rein orchid	1B.1	Generally dry, open sites; shrubland; coniferous forest; < 500 m.	No		Present in Seashore (PORE). Jepson does not recognize subspecies (Hickman 1993).	
Piperia michaelii	Michael's rein orchid	*FSacS C*; 4.2	Coastal scrub and bluff scrub, closedcone and lower montane coniferous forests, chaparral, and cismontane woodland	Yes	No	Present in Seashore (PORE). Species occurs in the vicinity of the McClure Quarry, but not within the proposed hauling route.	
Pleuropogon hooverianus	North Coast semaphore grass	*FSacS C*; ST; 1B.1	Mesic areas in broadleafed upland forest, **meadows**, North Coast coniferous forest, and vernal pools.	Yes	No	Known from fewer than 10 occurrences (CNPS 2007). Not known from Seashore (PORE) or Tomales Bay area (NDDB 2007).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Pleuropogon refractus	nodding semaphore grass	4.2	Mesic areas in lower montane coniferous forest, **meadows**, North Coast coniferous forest, and **riparian forest**.	Yes	No	Present in Seashore (PORE).	
Polygonum marinense	Marin knotweed	*FSacSC*; 3.1	**Coastal salt marshes and brackish marshes**.	Yes	Yes	Known from fewer than 20 occurrences. Taxonomic status uncertain, related to *P. aviculare*; possibly synonym of *P. robertii*, a non-native plant (CNPS 2007). Present in several locations in the Seashore. Mapped previously on western side of Tomales Bay north of Inverness (NDDB 2007). In 2003 one individual observed in undiked marsh 2,000 feet north of Giacomini Ranch.	
Quercus parvula var. tamalpaisensis	Tamalpias oak	1B.3	Lower montane coniferous forest.	No		Not known from Seashore (PORE). Known only from Mt. Tamalpais. May hybridize with *Q. wislizenii* var. *frutescens*. Not recognized by the *Jepson Manual* as a separate species (CNPS 2007.)	
Ranunculus lobbii	Lobb's aquatic buttercup	4.4	Mesic areas in cismontane woodland, North Coast coniferous forest, **valley and foothill grassland**, and vernal pools.	Yes	No	Present in Seashore (PORE). Found south of Olema Marsh in sag pond in Bear Valley (A. Ryan, NPS, *pers. obs.*).	
Ribes victoris	Victor's gooseberry	4.3	Broadleaf upland forest, chaparral	No	No	One report from Tomales Bay State Park in 2001 (NDDB 2007).	
Rhynchospora californica	California beaked-rush	*FSacSC*; 1B.1	Bogs and fens; lower montane coniferous forest; seeps in meadows; **freshwater marshes.**	Yes	No	Known from fewer than 10 occurrences (CNPS 2007). Mapped on western side of Inverness Ridge. Last seen in 1945 (NDDB 2007).	
Sidalcea calycosa ssp. *rhizomata*	checkerbloom	1B.2	**Marshes and swamps** near coast.	Yes	No	Present in Seashore (PORE).	

APPENDIX A -1. LIST OF SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT STUDY AREA AND VICINITY AND QUARRY HAULING ROUTES

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Marin County); California Natural Diversity Database (NDDB; 2007; Inverness, Tomales, and Point Reyes NE quadrangles), Point Reyes National Seashore rare plant database (PORE), and CNPS (2007; Inventory of rare and endangered vascular plants of California). Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

Scientific name	Common name	Status	Habitat	Habitat Present	Species Present	Comments	
Sidalcea hickmanii ssp. *viridis*	Marin checkerbloom	*FSacSC*; 1B.3	Serpentinite areas in chaparral.	No		One specimen identified by Howell near Drakes Bay in 1941; another collected in 1964 (NDDB 2007).	
Spartina foliosa	Cordgrass	*FSacSLC*	Low intertidal salt marsh and mud flats	Yes	Yes	Fringes undiked tidal channels north of Giacomini Ranch and the northmost portion of Lagunitas creek (L. Parsons and A. Ryan, NPS, pers. obs.).	
Stebbinsoseris decipiens	Santa Cruz microseris	*FSacSC*; 1B.2	Open areas, sometimes serpentinite, in broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, and **coastal scrub**.	Yes	No	Known from fewer than 20 occurrences (CNPS 2007). Not known from Seashore (PORE) or Tomales Bay area (NDDB 2007).	
Stellaria littoralis	starwort	4.2	**Marshy fields; marshes**; coastal bluffs; < 40 m.	Yes	No	Common in coastal portions of Park (PORE). Not common in Tomales Bay area (NDDB 2007).	
Streptanthus batrachopus	Tamalpais jewelflower	*FSacSC*; 1B.3	Serpentinite areas in closed-cone coniferous forest and chaparral.	No		Known from fewer than 10 occurrences in the Mt. Tamalpais area (CNPS 2007). Intergrades with *S. barbiger*.	
Streptanthus glandulosus ssp. *pulchellus*	Mount Tamalpais jewelflower	1B.2	Serpentinite areas in chaparral and valley and foothill grassland.	No		Endemic to the Mt. Tamalpais area. Present in GGNRA (PORE).	
Streptanthus niger	Tiburon jewelflower	FE; SE; 1B.1	Serpentinite areas in valley and foothill grassland.	No		Known from only three occurrences on the Tiburon Peninsula (CNPS 2007).	
Trifolium amoenum	showy Indian clover	FE; 1B	**Valley and foothill grassland; coastal bluff scrub**; sometimes on serpentine soil; open, sunny areas; swales	Yes	No	Last recorded in Olema area in 1886. One plant rediscovered in Bodega area in 1993 and another in 1996 (CNPS 2007).	
Triphysaria floribunda	San Francisco owl's- clover	*FSacSC*; 1B.2	Serpentinite areas in coastal prairie and valley and foothill grassland.	No		Present in Seashore (PORE).	

FEDERAL, STATE, AND CNPS STATUS CODES

FEDERAL LISTING

FE	=	Listed as endangered under federal Endangered Species Act.
FT	=	Listed as threatened under federal Endangered Species Act.
FPE	=	Proposed for listing as endangered under the federal Endangered Species Act.
FPT	=	Proposed for listing as threatened under the federal Endangered Species Act.
FSacSC	=	Former U.S. Fish and Wildlife Service, Sacramento Office, Species of Concern (formerly a category 2 candidate for listing).
FSacSLC		Former U.S. Fish and Wildlife Service, Sacramento Office, Species of Local Concern (formerly a category 2 candidate for listing).

STATE LISTING

SE	=	Listed as endangered under the California Endangered Species Act.
ST	=	Listed as threatened under the California Endangered Species Act.
SR	=	Listed as rare under the California Endangered Species Act.

CALIFORNIA NATIVE PLANT SOCIETY (CNPS) LISTING

1A	=	Plants presumed extinct in California.
1B	=	Plants rare, threatened, or endangered in California.
2	=	Plants rare, threatened, or endangered in California, but more common elsewhere.
3	=	Plants about which we need more information – a review list.
4	=	Plants of limited distribution – a watch list.

CNPS THREAT RANKS

0.1	=	Seriously threatened in California (high degree/immediacy of threat)
0.2	=	Fairly threatened in California (moderate degree/immediacy of threat)
0.3	=	Not very threatened in California (low degree/immediacy of threats or no current threats known)

References

California Natural Diversity Database (NDDB). 2007. Search of Inverness, Tomales, and Point Reyes NE 7.5 minute U.S. Geological Survey quadrangles. California Department of Fish and Game, Sacramento, CA.

California Native Plant Society. 2007. Inventory of rare and endangered vascular plants of California. Sixth Edition. California Native Plant Society, Sacramento, CA.

Hickman, J.C., ed. 1993. The Jepson Manual: higher plants of California. University of California Press, Berkeley and Los Angeles, CA.

Howell, J.T., ed. 1970. Marin Flora: Manual of the Flowering Plants and Ferns of Marin County, California. University of California Press, Berkeley and Los Angeles, CA.

Parsons, Lorraine. Wetland Ecologist, Point Reyes National Seashore. Personal observation.

Point Reyes National Seashore (PORE). Database on rare plant occurrences within PORE and north district of Golden Gate National Recreation Area (GGNRA).

Rodgers, Jane. 2007. Personal Communication

Ryan, Amelia. Point Reyes National Seashore. Personal observation

U.S. Fish and Wildlife Service. May 7, 2005. Official List of Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in Marin County and Inverness, Tomales, and Point Reyes NE quadrangles. Document Number: 070507061229. Sacramento, CA.

USFWS (U.S. Fish and Wildlife Service). In preparation. *Coastal salt marsh recovery plan*. Prepared by U.S. Fish and Wildlife Service.

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Mammals							
Antrozous pallidus	pallid bat	CSC	Found in any areas that have structures or tree hollows (G. Fellers, USGS, 2001).	No	No	Occurrences near Tocaloma/Olema (NDDB 2007).	
Aplodontia rufa phaea	Point Reyes mountain beaver	FSacSC	Coastal areas; North facing slopes of hills and gullies with sword ferns and thimbleberries	No	No	Historic occurrences near Mt. Wittenberg, Bear Valley Ranch, and Inverness; 1981 survey did not locate extant populations at first two locations (NDDB 2007).	
Arctocephalus townsendi	Guadalupe fur seal	FT	Open ocean, haul out on islands	No	No	No records within Tomales Bay.	
Balaenoptera borealis	sei whale	FE	Offshore occurrence	No	No	No records within Tomales Bay.	
Balaenoptera musculus	blue whale	FE	Offshore occurrence	No	No	No records within Tomales Bay.	
Balaenoptera physalus	finback whale	FE	Offshore occurrence	No	No	No records within Tomales Bay.	
Corynorhinus townsendii townsendii	Townsend's western big-eared bat	FSacSC	Roosts in limestone caves, lava tubes; roosts only in the open, hanging from walls and ceilings.	No	No	Roost found near Tocaloma (NDDB 2007). There are known colonies near Inverness park, and 5 mi S of Olema (G. Fellers, USGS, 2005).	
Enhydra Lutris	Southern sea otter	FT	Occurs in bays and coastal waters	No	No	Listed as threatened only south of Point Conception, California (USFWS 2007). Occurs rarely in Tomales Bay; live foraging sea otter documented in 2004 (S. Allen 2005), but is	
Eschrichtius robustus	gray whale	FD	Occurs as migrant in nearitic waters along outercoast..	No	No	Annually seen in Tomales Bay and feeding noted; carcass found in 1976 (S. Allen, Seashore, 2005, D. Adams, Seashore, 2001)	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Eubalaena glacialis (=Balaena glacialis)	right whale	FE	Offshore occurrence	No	No	No records within Tomales Bay.	
Eumetopias jubatus	Steller sea lion	FT, FX	Nearshore and rocky intertidal area and Tomales Bay	No	No	Historically bred at Point Reyes Headlands (S. Allen, Seashore, 2001)	
Eumops perotis californicus	greater western mastiff-bat	FSacSC	Rocky cliffs	No	No	Not known to occur locally.	
Lontra canadensis sonorae (=Lutra canadensis sonorae)	Southwestern river otter	CSC	Estuaries, rivers, marshes, and riparian areas.	Yes	Yes	First observed near Giacomini Ranch in 1992 (PWA et al. 1993). Since 2001, common sightings in Lagunitas Creek and portions of Giacomini Ranch drainage ditches. Burrow observed adjacent to northwestern corner of West Pasture in 2002 (ARA et al. 2002).	
Megaptera novaeangliae	humpback whale	FE	Open ocean and nearshore	No	No	Occurs around Point Reyes Headlands (S. Allen, Seashore, 2001).	
Myotis evotis	long-eared myotis bat	FSacSC	Douglas-fir forest	No	No	Occurrences near Five Brooks (G. Fellers, USGS, 2001).	
Myotis thysanodes	fringed myotis bat	FSacSC	Roosts in barns and other buildings; forages over wetlands, fields, and forest.	Yes	Unknown		
Myotis volans	long-legged myotis bat	FSacSC	Roosts in barns and other buildings; forages over wetlands, fields, and forest.	Yes	Unknown	Less common; occurs in Park (G. Fellers, USGS, 2001).	
Myotis yumanensis	yuma myotis bat	FSacSC	Roosts in barns and other buildings; forages over wetlands, fields, and forest.	Yes	Unknown	Observed in Bear Valley near Park headquarters (G. Fellers, USGS, 2001).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Phoca vitulina richardii	Pacific harbor seal	MMPA	Open waters in coastal and bay waters and Intertidal	Yes	Yes - Rare	Wanders with the tide up the estuarine reaches of Lagunitas Creek on occasion (ARA et al. 2002).	
Physeter catodon	sperm whale	FE	Offshore occurrence, but carcasses wash ashore in bays and estuaries.	No	No	No records in Tomales Bay; carcass washed ashore in Drakes Estero 2004. (S. Allen, Seashore, 2005)	
Zalophus californianus	California sea lion	None (MMPA)	Bays and estuaries	Yes	No	Occurs in Tomales Bay coincident with herring runs, including up to the town of Point Reyes Station (ARA et al. 2002, S. Allen, Seashore, 2005).	
Zapus trinotatus orarius	Point Reyes jumping mouse	FSacSC	Riparian and grassland	Yes	No	No individuals caught during trapping surveys conducted in 2002 (ARA et al. 2002). It does occur on the Point Reyes Penimsula (G. Fellers, USGS, 2005)	
Birds							
Accipiter cooperi	Cooper's hawk	CSC	Riparian shrubs and trees	Yes	Yes	Common migrant and fairly common winter resident at southern end of Tomales Bay and Olema Marsh. Breeds irregularly on east slope of Inverness Ridge (ARA et al. 2002).	
Accipiter striatus	sharp-shinned hawk	CSC	Riparian shrub, and trees	Yes	Yes	Common migrant and fairly common winter resident at southern end of Tomales Bay and Olema Marsh. Breeds irregularly on east slope of Inverness Ridge (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Agelaius tricolor	tricolored blackbird	FSacSC	Open country, protected nesting substrate. Nests colonially in freshwater marsh habitat.	Yes	Yes	Breeds infrequently in southern Tomales Bay, but not on Giacomini Ranch. Large flocks occur around feed lot on Ranch and on pastures in fall-winter months (ARA et al. 2002).	
Ammodramus savannarum	grasshopper sparrow	BSSC2; S2	Short to mid-height grassland.	Yes	Yes	Fairly common breeder (Apr-Aug) on east shore of Tomales Bay. Present in East Pasture of Giacomini Ranch in summer 2002 (ARA et al. 2002).	
Amphispiza belli belli	bell's sage sparrow	FSacSC; CSC	Breeds in chaparral and arid shrub habitat.	No	No	Distribution confined to Carson Ridge, Mt. Tamalpais. Very rare vagrant to Park (ARA et al. 2002).	
Aquila chrysaetos	golden eagle	CSC; S3	Nests in rolling foothill mountain areas, in cliffs or large trees	No	Yes	Usually nests in northern Marin county, but has nested in Point Reyes. Occasional flyover sighting in Project Area (ARA et al. 2003). Seen 12/15/05 flying over Giacomini fields(J. Evens, ARA, 2005)	
Anser albifrons elgasi	tule greater white-fronted goose	BSSC2			Yes	Rare winter visitor to moist pastures and ponds in Project Area (ARA et al. 2002)	
Ardea alba	great egret	S4	Nests in large trees near marshes, tide flats, irrigated pastures.	Yes	Yes	Common in all wetlands around Tomales Bay; nests in Inverness Park and forages locally in shallow estuarine waters and tidal, freshwater and brackish marshes and moist pastureland.	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Ardea herodias	great blue heron	S4	Nests in tall trees, cliffsides, and marshes near foraging areas.	Yes	Yes	Rookery in Inverness Park (NDDB 2007) and Bear Valley. Forages regularly on Giacomini Ranch (ARA et al. 2002).	
Arenaria melanocephalus	black turnstone	FSacSC	Rocky shores	No	No	Occurs along Tomales Bay. Moderately common. (G. Fellers, USGS, 2005).	
Asio flammeus	short-eared owl	CSC; BSSC2	Tidal marshes, lowland meadows, and swales.	Yes	Yes	Breeds at Pt Reyes, and there is a chance it breeds within the Tomales Bay watershed (G. Fellers, USGS, 2005). Forages sporadically during fall and winter in tidal marsh north of Millerton Point. Sporadically roosts in *Grindelia* high marsh in undiked marsh north of Giacomini Ranch. (ARA et al. 2002).	
Asio otus	long-eared owl	BSSC2	Nests in riparian bottomlands and hunts in adjacent open fields.	Yes	No	Was not found in Project Area during field surveys. Irregular visitor to riparian areas in Point Reyes region and has occasionally bred locally (ARA et al. 2002).	
Athene cunicularia var. hypugaea	burrowing owl	FSacSC, CSC; BSSC1	Nests in burrows in open fields; winters in same area.	No	Yes – Rare	Reported as occurring on Giacomini Ranch in 1992 (PWA et al. 1993). Occurs very rarely in coastal Marin. Not detected in 2001-2002 (ARA et al. 2002). Regularly occurs (but is not common) at Point Reyes (G Fellers, USGS, 2005)	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Aythya americana	redhead	BSSC2	Marshy lakes and ponds		Yes	Occasional in outer Tomales Bay. Irregular visitor to ponds in Project Area (ARA et al. 2002).	
Botaurus lentiginosus	American bittern	FSacSC; BSSC3	Freshwater, brackish and coastal marshes		Yes	Sporadic occurrences at Olema Marsh (ARA et al. 2002).	
Brachyramphus marmoratus	marbled murrelet	FT, FX	Nests in old growth conifer forest near open ocean and bays for foraging.	No	No	Not known to breed in Marin County, but occurs in nearitic waters most months. No records in Tomales Bay (ARA et al. 2003).	
Branta bernicla nigricans	black brant	BSSC3	Shallow bays and coastal marshes	Yes	Yes	Abundant seasonal migrant through outer Tomales Bay. Occasional in ponds in Project Area (ARA et al. 2002).	
Branta canadensis leucopareia	Aleutian Canada goose	FD	Wet pastures, shallowly flooded fields, and marshes along coastal Marin County, especially during fall and winter.	Yes	Yes	Sporadically roosts in diked marsh and pasture areas south of north levee in West Pasture of Giacomini Ranch (ARA et al. 2003). Two present in mixed flock 12/19/05 (J. Evens, ARA, 2005).	
Branta canadensis minima	cackling Canada goose	BSSC2			Yes?	Very rare transient through Project Area. (ARA et al. 2002). Recorded in project area 12/05 in mixed flock with Canada geese and Aleutians (J. Evens, ARA, 2005).	
Bucephala albeola	bufflehead	BSSC3			Yes	Common in open water habitat in Tomales Bay during winter. Found in Project Area (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Buteo regalis	ferruginous hawk	FSacSC; CSC	Breeds in open country, including prairie grassland and shrubland.	Yes	Yes	Casual visitor to the Giacomini Ranch with several sightings, mostly during fall and winter, to pastures and wetlands (ARA et al. 2002).	
Calidris canutus	red knot	FSacSC	Beaches and mudflats	Yes	No	Occurs irregularly and in low numbers on Tomales Bay mudflats (G. Fellers, USGS, 2005). Formerly regular, in low numbers, at mouth of Lagunitas Creek; not recorded in recent years (J. Evens, ARA, 2005).	
Catharus ustulatus	Swainson's thrush	BSSC2	Breeds in riparian and coastal scrub habitats	Yes	Yes	Locally common breeder. Occurs in Project Area (ARA et al. 2002). Dependant on riparian understory cover (J. Evens, ARA, 2005).	
Ceryle alcyon	belted kingfisher	BSSC3			Yes	Nests along Lagunitas Creek and Sir Francis Drake Blvd adjacent to Project Area. Common year-round resident (ARA et al. 2002).	
Chaetura vauxi	Vaux's swift	FSacSC	Nests in coniferous forests. Often forages over rivers and lakes.		Yes	Locally uncommon. Suspected of breeding in mature and decadent conifer forests of Bolinas and Inverness Ridges. Uncommon transient flying over Giacomini Ranch (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Charadrius alexandrinus nivosus	western snowy plover	FT, FX	Sandy beaches, salt pond levees; needs sandy, gravelly, or friable soil for nesting.	No	No	Nests on outer coastal beaches at Park. May have bred formerly and/or occasionally at Dillon Beach, but does not breed along the shoreline of Tomales Bay. Occasional migrant/winter records for tidal flats at south end of Tomales Bay (Stenzel et al. 1981).	
Chidonias niger	black tern	FSacSC; CSC; BSSC3		No	No	Rare vagrant over tidal shallows (ARA et al. 2002).	
Chondestes grammacus	lark sparrow	FSacSC		No	Yes - Rare	Breeds in Chileno Valley and eastern shore of Tomales Bay. Rare spring and fall transient to grassland at south end of Tomales Bay. Sighted once in Project Area in spring 2002 (ARA et al. 2003).	
Circus cyaneus	northern harrier	CSC; BSSC2	Open fields, savannas, meadows and marshes; in mating season found in marsh-like areas.	Yes	Yes	Observed in Giacomini Ranch and vicinity since 1961. Common forager over Giacomini Ranch. Breeds in northwestern corner near Project Area (ARA et al. 2002).	
Coccyzus americanus occidentalis	yellow-billed cuckoo	FC; SE		No	No	One was sighted in the Point Reyes Penninsula in August 2003 and fall 2005. Does not breed in the Park. Has never nested locally; no habitat.(J. Evens, ARA, 2005).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Contopus cooperi	olive-sided flycatcher	FSacSC; BSSC2	Nests in Douglas Fir and Bishop Pine association.	No	Yes	Nests on Inverness Ridge (Shuford 1993). Does not breed at Giacomini Ranch, but was observed near Project Area, probably as post-breeding dispersant (ARA et al. 2002).	
Coturnicops noveboracensis	yellow rail	CSC; BSSC2	Freshwater marshlands	Yes	Yes	Very rare visitor to southern Tomales Bay. Sighted several times since 1996, including in tidal marsh and riparian areas of Project Area in winter 2001-2002 (ARA et al. 2002). Sighted each subsequent winter2002-2005; records increasing in greater Bay Area (J. Evens, ARA, 2005).	
Cypseloides niger	black swift	FSacSC; CSC	Breeds on cliffs adjacent or behind waterfalls in canyons and sea-bluffs above surf.	No	No	Very rare fall migrant through southern Tomales Bay. Observed at Dillon Beach and Point Reyes headlands in migration. Not known to breed in Marin County (ARA et al. 2002).	
Dendroica occidentalis	hermit warbler	S3	Breeds in Douglas fir forest.	No	Yes	Uncommon breeder on Inverness Ridge. Occasionally uses riparian scrub area on Point Reyes Mesa adjacent to Giacomini Ranch (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Dendroica petechia brewsteri	yellow warbler	CSC	Nests and forages in riparian vegetation – California bay and willow.	Yes	Yes	Breeds regularly near confluence of Olema and Lagunitas Creeks and historically near Inverness Park. Also appear to breed in riparian scrub area on Point Reyes Mesa adjacent to Giacomini Ranch. Common fall migrant through riparian corridor (ARA et al. 2002).	
Diomedea albatrus (=Phoebastria albatrus)	short-tailed albatross	FE	north Pacific Ocean, most frequently the productive edge of the outer Continental Shelf	No	No	Closest breeding colony is in Izu, Japan. Extremely rare wanderer offshore, but becoming more frequent (ARA et al. 2002). Some individuals seen most years off the Marin/Sonoma coast. Not within Tomales Bay (G. Fellers, USGS, 2005).	
Elanus leucurus	white-tailed kite	FSacSC	Coniferous forest; open grasslands.	Yes	Yes	Common breeder on Inverness Ridge. Common during all seasons in pasture and marsh areas in northwestern corner of Giacomini Ranch (ARA et al. 2002).	
Empidonax difficilis	Pacific-slope flycatcher	FSacSC	Riparian habitat	Yes	Yes	One of the most common breeding passerines in the riparian forests, thickets, and scrub on the perimeter of the Giacomini Ranch (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Empidonax traillii brewsteri (=Colaptes chrysoides)	willow flycatcher	SE (nest.)	Riparian habitat	Yes	Yes - Rare	Does not breed in Park or in Marin County. Uncommon migrant through southern Tomales Bay in spring and fall. Observed on Giacomini Ranch in Aug.-Sept. 2001 (ARA 2002).	
Eremophila alpestris actia	California horned lark	BSSC3	Coastal areas from Sonoma toSan Diego counties.	Yes	Unknown	Uncommon visitor to outer Point Reyes. Probably occurs in the Project Area (ARA et al. 2002). Occurs along the east side of Tomales Bay. Has been recorded on a number of Christmas bird counts (G. Fellers, USGS, 2005).	
Falco columbarius	merlin	CSC	Estuaries and coastal embayments	Yes	Yes	Regular winter visitor to southern end of Tomales Bay. Present in very low numbers in late autumn through winter, hunting over undiked marsh north of Giacomini Ranch and pastures (ARA et al. 2002).	
Falco mexicanus	prairie falcon	BSSC3	Nests in dry, open areas		No	Rare transient, but have been documented wintering in southern Tomales Bay in 2002 (ARA et al. 2002). Seen occasionally as a fly by over south end of Tomales Bay, but fairly regular in fall and winter at Abbott's Lagoon (J. Evens, ARA, 2005).	
Falco peregrinus anatum	American peregrine falcon	FD	High cliffs, ledges for nesting		Yes	May breed at Park. Regularly observed foraging over Giacomini Ranch and undiked marsh north of Ranch (ARA et al. 2003).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Fratercula cirrhata	tufted puffin	CSC; BSSC1; S2	Open ocean. Nest on islands and rarely on ocean cliffs.	No	No	Occasional in the vicinity of Drakes Bay. Not known to occur in Tomales Bay (NDDB 2007).	
Gavia immer	common loon	CSC		Yes	Yes	Occurs in open water in Tomales Bay. Occasionally wanders up Lagunitas Creek on high winter tides (ARA et al. 2002).	
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	FSacSC; CSC; BSSC2	Freshwater, saltwater marshes with thick, continuous cover	Yes	Yes	Point Reyes may support one-third of total population of this taxon. Breeds commonly in coastal marshes throughout Point Reyes, Olema, and Bear Valley marshes. Observed in riparian corridor along western and eastern edges of Giacomini Ranch and Olema Marsh (ARA et al. 2002).	
Grus canadensis tabida	sandhill crane	ST			Yes – Rare	Very rare visitor to wet pastures on Giacomini Ranch (ARA et al. 2002).	
Haliaeetus leucocephalus	bald eagle	FT, SE	Forages in large water body.	No	No	Does not breed at Park. Very rare fall/winter visitor to Tomales Bay. May forage occasionally on Giacomini Ranch, but not observed during 2001-2002 surveys (ARA et al. 2002).	
Haematopus bachmani	black oystercatcher	FSacSC	Rocky shorelines on the coast.	No	No	Occurs on rocky shoreline at the mouth of Tomales Bay; not likely to occur at South end due to lack of habitat. Breeds on outer Point Reyes and Tomales Point in very limited habitat.(J. Evens, ARA, 2005).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Histrionicus histrionicus	harlequin duck	FSacSC, CSC; BSSC1	Breeds on swift flowing northern rivers, nesting on rocky islands in rivers or in sheltered sites on banks.	No	No	Rare winter visitor to rocky Tomales Bay shoreline (ARA et al. 2002).	
Icteria virens	yellow-breasted chat	BSSC3; S3	Dense riparian thickets.		Yes	Sometimes breeds in riparian thickets in the Project Area. Last seen in July 2001 (ARA et al. 2002). Observed in willows along lower Lagunitas Creek (near old dam site), August 2005 (J. Evens, ARA, 2005).	
Ixobrychus exilis hesperis	Western least bittern	S1; BSSC3	Nests in marshes and pond/reservoir fringes	Yes	Yes	Rare in the area. Bred in Olema Marsh in 1998. Seen in June 2002 (ARA 2002).	
Lanius ludovicianus	loggerhead shrike	FSacSC, CSC; S4			Yes	Uncommon visitor to Marin County coast during fall-spring. Breeds in interior areas of watershed such as Chileno Valley. Occasionally observed during fall/winter in undiked marsh north of Giacomini Ranch (ARA et al. 2002).	
Larus californicus	California gull	CSC; S2			Yes	Fairly common non-breeding visitor to Tomales Bay and vicinity. Occasional, incidental visitor to dairy, open water, and irrigated fields (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Laterallus jamaicensis coturniculus	California black rail	ST	Freshwater, saltwater or brackish marshes bordering large bays	Yes	Yes	Once very common in Tomales Bay marshes. Occasional breeder in Olema and Bear Valley marshes. Potential breeding birds consistently present in undiked marsh north of Giacomini Ranch and, during surveys, in freshwater marsh in West Pasture (ARA et al. 2002).	
Limosa fedoa	marbled godwit	FSacSC	Nest in grassy marshes and feed in beaches and mudflats	Yes	No	A common visitor to Tomales Bay in fall, winter, spring. Large numbers may congregate in flooded pastures on high tides, but usually forages on tidal flats and adjacent tidal marsh (J. Evens, ARA, 2005).	
Melospiza melodia samuelis	San Pablo song sparrow	FSacSC; CSC			No	Does not occur in Tomales Bay watershed (ARA et al. 2002).	
Numenius americanus	long-billed curlew	FSacSC		Yes	Yes	Occurs regularly on tidal flats north of the Giacomini Ranch and on flooded pastures during fall and winter (J. Kelly, 2001[1]).	
Numenius phaeops	whimbrel	FSacSC	Coastal marshes, beaches, and rocky shore	Yes	No	*Occurs in Tomales Bay.*(G. Fellers, USGS, 2005).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Nycticorax nycticorax	black-crowned night heron	S3		Yes	Yes	Small numbers roost regularly in northwestern corner of Giacomini Ranch and occasionally in willows along Lagunitas Creek. Also roosts irregularly in willows along Tomasini Creek at base of Point Reyes Mesa (ARA et al. 2002).	
Oceanodroma homochroa	ashy storm-petrel	FSacSC'; CSC; BSSC2	Nests on rocky cliff areas and off-shore islands.	No	No	Observed in northern portion of Tomales Bay and Point Reyes Headlands. Extremely unlikely in southern Tomales Bay (ARA et al. 2002).	
Pandion haliaetus	osprey	CSC	Large nests in tree tops within 15 miles of waterbodies with fish	Yes	Yes	Breeds on Inverness Ridge. Approximately 20 nests per year distributed along Inverness Ridge from Five Brooks to Tomales Bay State Park. Observed regularly foraging over Giacomini Ranch (ARA et al. 2002).	
Pelecanus erythrorhynchos	American white pelican	CSC; BSSC1	Nests on large interior lakes.		Yes	Observed occasionally on Lagunitas Creek near Project Area (ARA et al. 2002).	
Pelecanus occidentalis californicus	California brown pelican	FE, SE	Open water and roosts on mudflats; breed in Channel Islands.	Yes	Yes	Does not breed at the Park, but fairly common non-breeding visitor to Tomales Bay. Irregular visitor to Giacomini Ranch in small numbers. Most commonly observed in fall foraging in open water or roosting along shoreline of Lagunitas Creek (ARA et al. 2003).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Phalacrocorax auritus	double-crested cormorant	CSC	Open water and nearshore feeding; nests in trees and structures.	Yes	Yes	Common year-round resident in southern Tomales Bay and along Lagunitas Creek. Roosting flocks of up to several hundred birds observed on tidal flats at mouth of Lagunitas Creek. Believed to breed on outer coast (ARA et al. 2002).	
Plegadus chihi	white-faced ibis	CSC; S1	Shallow freshwater marshes	Yes	Yes – Rare	Rare transient. Large flocks visited Project Area in late spring 2000/2002 (ARA et al. 2002).	
Porzana carolina	sora	BSSC3	Vegetated brakish and freshwater marshes	Yes	Yes	Uncommon breeder in the Project Area. Present in 2002 breeding season (ARA 2002).	
Progne subis arboricola	purple martin	BSSC1; S3	Woodlands and low-elevation coniferous forest.	No	Yes	Regular breeder on Inverness Ridge. Forages in Olema Marsh (ARA et al. 2002).	
Ptychotamphus aleuticus	Cassin's auklet	BSSC2			No	Breeds on the Farallon Islands and has been rarely seen at the mouth of Tomales Bay (ARA et al. 2002).	
Rallus longirostris obsoletus	California clapper rail	FE, SE	Salt marsh, estuarine	Yes	Yes	Occurs sporadically in undiked marsh north of Giacomini Ranch. Observed for four to five years during 1990s in undiked marsh. However, none detected in this area since 2001 (ARA et al. 2002 and J. Evens, ARA, 2005).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Rhynchops niger	black skimmer	FSacSC; BSSC3	Nests on sandy beaches, and gravel bars.	Yes	No	Nests in Salton Sea and San Diego Bay.(NDDB 2007) Has been spotted as transient in Bodega Bay (McCaskie et al. 1979[2]). Being seen with increasing regularity in San Francisco Bay (G. Fellers, USGS, 2005). Occasional transient at Tomales Bay (J. Evens, ARA, 2005).	
Riparia riparia	bank swallow	ST; FSacSC			Yes - Rare	Rare transient over Giacomini Ranch, especially in fall (ARA et al. 2002).	
Selasphorus rufus	rufous hummingbird	FSacSC			Unknown	Migrates through Coast Range, but does not breed. Uncommon transient in southern Tomales Bay in spring and fall (ARA et al. 2002) Very closely resembles Allen's hummingbird, so presence in Project Area is possible, but not confirmed (ARA et al. 2002).	
Selasphorus sasin	Allen's hummingbird	FSacSC	Riparian, mixed evergreen, Douglas fir, redwood, Bishop pine forests, and coastal scrub.	Yes	Yes	Common breeder in southern Tomales Bay and Marin County. Breeds in the Project Area in riparian thickets and blackberry bushes (ARA et al. 2002).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Sphyrapicus ruber	red-breasted sapsucker	FSacSC	Nests in mixed evergreen or riparian forests adjacent to Douglas fir forests.	Yes	Yes	Rather uncommon in coastal Marin County. Observed in alder-dominated riparian habitat on western edge of Giacomini Ranch during fall and winter (ARA et al. 2002) Occasionally seen in the Bear Valley area. One bird was resident here for several months in the fall of 2005 (G. Fellers, USGS, 2005).	
Sterna elegans	elegant tern	FSacSC, CSC; BSSC3		Yes	Yes	Fairly common to abundant fall transient to shallow estuarine waters at southern end of Tomales Bay. Occurs in Project Area (ARA et al. 2002).	
Sternula antillarum browni (=Sterna, =albifrons)	California least tern	FE; SE	Nests along the coast in sparsely vegetated flats.	No	No	Very rare transient; no recent records (J. Evens, ARA, 2005).	
Strix occidentalis caurina	northern spotted owl	FT	Old growth forests or mixed old growth and mature trees	No	No	Nests in east slope canyons on Inverness Ridge at least 1 mile from Giacomini Ranch (D. Adams, Seashore, 2001). Dead bird found along Sir Francis Drake Highway in 1995 (ARA et al. 2002).	
Synthliboramphus hypoleucus	Xantus' murrelet	FSacSC; ST; BSSC2	Oceanic habitats.	No	No	No records of this marine species in Tomales Bay (Stallcup et al, 2000[1])	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Thryomanes bewickii	Bewick's wren	FSacSC	Riparian habitat. Most common in coastal scrub and drier habitats.	Yes	Yes	Very common and widespread throughout Marin County and Point Reyes Peninsula. Fairly common resident on Point Reyes Mesa bluff and in blackberry patches in riparian forests along perimeter of Giacomini Ranch (ARA et al. 2002).	
Toxostoma redivivum	California thrasher	FSacSC			No	Closest breeding population on Carson Ridge. Does not occur on Giacomini Ranch or southern Tomales Bay (ARA et al. 2002).	
Vireo bellii pusillus	Least Bell's vireo	FE, FX, SE	Riparian habitat	Yes	Yes – Rare	Occurs as extremely rare vagrant in riparian corridor along southern end of Lagunitas Creek. Sighted in Project Area near Lagunitas Creek in 1985 (ARA et al. 2003).	
Reptiles							
Caretta caretta	loggerhead turtle	FT	Continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters; nest on ocean beaches.	No	No	Observed in the outer coast; vagrant only in Tomales Bay.	
Chelonia mydas	green turtle	FT	Open ocean; nest on ocean beaches.	No	No	Observed in the outer coast; vagrant only in Tomales Bay.	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Clemmys marmorata mormorata (=*Emmys marmorata mormorata)*	northwestern pond turtle	FSacSC	Near-permanent water with basking sites	Yes	Yes	Observed in Lagunitas Creek and both the West and East Pastures of the Giacomini Ranch, although only one occurrence in West Pasture (Fong 2002, Fellers and Guscio 2002).	
Dermochelys coriacea	leatherback turtle	FE	Open ocean; nest on ocean beaches.	No	No	Observed in the outer coast; vagrant only in Tomales Bay.	
Lepidochelys olivacea	olive ridley sea turtle	FT	Open ocean	No	No	Observed in the outer coast; vagrant only in Tomales Bay.	
Phrynosoma coronatum frontale	California horned lizard	FSacSC	Arid areas with ants	No	No	No records in Tomales Bay (ARA et al. 2003).	
Amphibians							
Ambystoma californiense	California tiger salamander	FT	Ponds and streams near ground squirrel burrows	Yes	No	Not known from Marin County. Nearest populations are just S of Santa Rosa. (G. Fellers, USGS, 2005).	
Rana aurora aurora	northern red-legged frog	FSacSC	Ponds, streams, wet woodlands	Yes	No	Nearest records are from north of of Pt Arena (G. Fellers, USGS, 2005).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Rana aurora draytonii	California red-legged frog	FT, FX	Deep pools with dense, shrubby, or emergent vegetation. Oversummer in riparian habitat.	Yes	Yes	Present in numerous areas in Tomales Bay and the Seashore, some of which is Critical Habitat. Occurs in East and West Pastures on Giacomini Ranch. However, breeding adults occur only in West Pasture, specifically central portion of Fish Hatchery Creek and freshwater marsh (Fellers and Guscio 2002). Numbers have fluctuated since 2001 due possibly to salinity intrusion events in winter. Also occurs in Olema Marsh, although conditions make estimating population size difficult (G. Fellers, USGS, 2004).	
Rana boylii	foothill yellow-legged frog	FSacSC	Shallow streams with riffles and rocky substrate	Yes	No	Observed near Salmon Creek and Walker Creek (NDDB 2007). Nearest occurrence reported 2 miles from Giacomini Ranch in a hillside drainage near Inverness (G. Fellers, USGS, 2001).	
Fish							
Acipenser medirostris	green sturgeon	FT	Feeds in estuaries and bays, but breeds in the freshwater of large rivers.	Yes	Yes	Last official sighting in Tomales Bay in 1995 (ARA et al. 2003). Listing applies only to the Sacramento River population(s).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Eucyclogobius newberryi	tidewater goby	FE	Brackish water in shallow lagoons and lower stream reaches	Yes	Yes	Last observed in Tomales Bay watershed in 1953 until 2002, when small population discovered in the portion of Tomasini Creek within the Giacomini Ranch (ARA et al. 2002). As of 2006, also found in Fish Hatchery Creek in West Pasture and East Pasture drainage ditch system.	
Hypomesus transpacificus	delta smelt	FT		No	No	Occur only in Sacramento and San Joaquin River watersheds.	
LAMPETRA TRIDENTATA	Pacific lamprey	FSacSC	Anadromous in high flow systems.	Yes	Yes - Rare	Listed as common in Lagunitas Creek (Tomales Bay Association 1995) and present in Olema Creek (Ketcham et al. 2005) . Migrates through Project Area.	
Lavinia symmetricus ssp 2	Tomales roach	CSC	Freshwater portions of small creeks and streams and isolated pools.	Yes	No	Reported in Walker Creek and upstream portions of Lagunitas Creeks (NDDB 2007). Not observed in downstream portion of Lagunitas Creek or Giacomini Ranch streams and drainages during 2002 (ARA 2002) or 2005 (M. Reichmuth, Seashore, 2005).	
Oncorhynchus kisutch	coho salmon – central CA coast	FE, FX	Typically spawn in upper portions of watershed. Smolts use estuary for feeding and refugia; adults use estuary as holding area prior to migrating upstream.	Yes	Yes	Currently spawn in upstream portions of Olema Creek, Lagunitas Creek, Devil's Gulch, and San Geronimo Creek (NDDB 2007). Smolts found in downstream portion of Lagunitas Creek and Tomasini Creek in June 2005 (Ketcham et al. 2005).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Oncorhynchus mykiss	central CA coastal steelhead	FT, FX	Typically spawn in upper portions of watershed. Smolts use estuary for feeding and refugia; adults use estuary as holding area prior to migrating upstream.	Yes	Yes	Historically abundant in Lagunitas Creek and tributaries. Historical status in Tomasini and Fish Hatchery Creeks unknown. Smolts found in downstream portions of Lagunitas, Bear Valley, and Tomasini Creeks in 2004 and/or 2005. Juveniles also observed in Fish Hatchery Creek in 2002 and 2005 (ARA et al. 2002; Ketcham et al. 2005).	
Oncorhynchus tshawytscha	Southern Oregon/California coastal chinook salmon	FT, FX	Typically spawn in middle to upper portions of watershed. Smolts use estuary for feeding and refugia; adults use estuary as holding area prior to migrating upstream.	Yes	Yes	Typically found in all estuaries north of San Francisco Bay, except Tomales Bay. However, small numbers observed in Lagunitas Creek annually since 1998; Not likely a sustained population (B. Ketcham, Seashore, 2001). One stray found in Olema Creek in 2004 (M. Reichmuth, Seashore, 2005).	
Pogonichthys macrolepidotus	Sacramento splittail	FSacSC			No	Endemic to Central Valley; largely confined to Delta, Suisun Bay, Suisun Marsh, and Napa Marsh.	
Spirinchus thaleichthys	longfin smelt	FSacSC			No	Occurs at Estero de San Antonio (ARA et al. 2002).	
Invertebrates							

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Adela oplerella	Opler's longhorn moth	FSacSC	Confined to serpentine soil-based grassland.	No	No	Recorded occurrences are 18 sites extending from 5 miles southeast of Nicasio in Marin County to Gilroy area in Santa Clara County and Oakland on the inner Coast Ranges (USFWS).	
Caecidotea tomalensis	Tomales isopod	FSacSC; S2	Stagnant freshwater ponds	Yes	Unknown		
Carterocephalus palaemon	Sonoma arctic skipper	FSacSC	Adults use glades and openings in heavily forested woods, moist meadows, streamsides. Host plants include purple needlegrass and iris.	No	No	Nearest recorded occurrence is Ft. Bragg (S. Allen, Seashore, 2001).	
Cicindela hirticollis gravida	sandy beach tiger beetle	FSacSC; S1	Inhabits clean, dry, light-colored sand in upper zone of beach dunes.	No	No	Could occur near Lawson's Landing, but not on the Giacomini property, (G. Fellers, USGS, 2005).	
Coelus globosus	globose dune beetle	FSacSC; S1	Inhabits coastal sand dune habitats commonly burrowing below the sand surface and dune vegetation of the foredunes and sand hummocks.	No	No	Moderately common in suitable dune habitat such as near North Beach. Could occur at Lawsons Landing. Needs sand dunes, so is unlikely to occur on Project Area (G. Fellers, USGS, 2005).	
Danaus plexippus	monarch butterfly	S3	Roosts in wind-protected tree groves with nectar and water sources nearbly.	No	No	Common migrant through west Marin County area, with winter roost in Bolinas and Stinson Beach (NDDB 2007).	
Haliotes chracherodii	black abalone	FC; S3	Found in intertidal and shallow subtidal zones down to a depth of about 20 feet.	Yes	No	Range from Mendocino to southern California.	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Haliotes sorenseni	white abalone	FE	Found in the subtidal zone down to at least 200 feet in open, exposed areas in Southern California.	No	No	Not found in Marin County (S. Allen, Seashore, 2001).	
Helminthoglypta arrosa williamsi	William's bronze shoulderband snail	FSacSC	Found under brush and weeds.		No	Only known from Hog Island on lower slopes of island (NDDB 2007).	
Helminthoglypta nickliniana awania	Nicklin's Penninsula Coast Range snail	FSacSC; S1			No	Only known population in the Point Reyes Lighthouse vicinity (NDDB 2007).	
Hydrochara rickseckeri	Ricksecker's water scavenger beetle	FSacSC, S1/S2	Ponds	Yes	No	Found in pond habitat in several northern California counties. Specimen from Bolinas collected in 1940 (NDDB 2007).	
Icaricia icarioides ssp. (=Plebejus icariodes parapheres)	Point Reyes blue butterfly	FSacSC, S1	Lupine is host plant for larvae.	No	No	Distribution and abundance unknown, but 1992 surveys located this butterfly at Tomales Point and North Beach dunes (D. Adams, Seashore, 2001).	
Incisalia mossii bayensis (=Callophrys mossii bayensis)	San Bruno elfin butterfly	FE; S1	Coastal mountains with grassy cover; sedum hostplant.	No	No	One occurrence reported at Dillon Beach, date unknown. Also known from Alpine Lake (NDDB 2007).	
Incisalia mossii marinensis (=Callophrys mossii marinensis)	Marin elfin butterfly	FSacSC; S1	Douglas-fir forest; sedum is host plant for larvae.	No	No	May occur in Douglas fir forest on Inverness Ridge (ARA et al. 2002).	
Ischnura gemina	San Francisco forktail damselfly	FSacSC; S2	Frequents wetlands with emergent vegetation and ponds or slow-moving creeks.	Yes	Yes	Nearest recorded occurrence to Giacomini Ranch is directly north of Tomasini Creek confluence with Tomales Bay at Railroad Point and terminus of Tomales Bay Trail (Hafernik and Mead 1992).	

APPENDIX A -2. LIST OF SPECIAL STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE GIACOMINI WETLAND RESTORATION PROJECT AND VICINITY

Information on species occurrences compiled from U.S. Fish and Wildlife Service Endangered and Threatened Species List (May 2007; Bolinas, Double Point, San Geronimo, Point Reyes NE, Tomales, Drakes Bay and Inverness quadrangles; Marin County bird species list); California Natural Diversity Database (NDDB 2007; Inverness, Tomales, and Point Reyes NE quadrangles), and Point Reyes National Seashore list of species protected under the Marine Mammal Protection Act (PORE). Status refers to listing either by federal government or state of California: Federal Species of Concern (FSC) listings have been eliminated, but regional USFWS office formerly established its own listing of Species of Concern, designated as FSacSC. Though this list is discontinued, the species from the former list are retained for consideration. Species presence in Project Area was determined from historical and recent sightings, as well as surveys conducted in 1993 and 2001-2002, and 2005 (PWA et al. 1993, ARA et al. 2002, Ketcham et al. 2005, NPS, unpub. data).

SCIENTIFIC NAME	COMMON NAME	Status	Habitat	Habitat Present ?	Species Present?	Comments	
Lichnanthe ursina	bumblebee scarab beetle	FSACSC ; S2	Coastal sand dunes	No	No	Ranges from Sonoma to San Mateo Counties. Observed at MCI/RCA property in Park in summer 2000-2001. Total distribution and abundance within Park unknown (D. Adams, Seashore, 2001).	
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	FE; S1	Dunes, scrub, and grasslands immediately adjacent to the coast.	No	No	Occurs in the coastal dunes of the Point Reyes Peninsula and observed near Dillon's Beach in 2003-2004 (NDDB 2007).	
Syncaris pacifica	California freshwater shrimp	FE; SE	Lowland coastal perennial streams	Yes	Probably not present	Found primarily in Sonoma, Marin, and Napa counties. Observed in Walker, Keys, Lagunitas, and Olema Creeks. Location of most sightings on Lagunitas and Olema Creeks were upstream of Giacomini Ranch (Fong 2003), although reported as occurring in lower Lagunitas Creek adjacent to Ranch in 2000 (Pearson 2000). Surveys found no individuals in creek near Ranch (2002) or in Olema Marsh (2005), although were present upstream on Lagunitas and Olema Creeks (Fong 2003).	

FEDERAL, STATE, AND CNPS STATUS CODES

FEDERAL LISTING

FE	=	Listed as endangered under federal Endangered Species Act.
FT	=	Listed as threatened under federal Endangered Species Act.
FPE	=	Proposed for listing as endangered under the federal Endangered Species Act.
FPT	=	Proposed for listing as threatened under the federal Endangered Species Act.
FC	=	Proposed as candidate for listing under the federal Endangered Species Act.
FD	=	Proposed for delisting under the federal Endangered Species Act. Undergoing 5-year monitoring program.
FX	=	Critical Habitat designated for this species
FSacSC	=	A Sacramento Fish and Wildlife Office Species of Concern (formerly a category 2 candidate for listing).
MMPA	=	Protected under the Marine Mammal Protection Act

STATE LISTING

SE	=	Listed as endangered under the California Endangered Species Act.
ST	=	Listed as threatened under the California Endangered Species Act.
SSC	=	Listed as a Species of Special Concern by the California Department of Fish and Game.

NATURAL DIVERSITY DATABASE LISTING

S1	=	Seriously endangered in California
S2	=	Endangered in California
S3	=	Restricted range or rare in California
S4	=	Statewide population apparently secure, some factors exist to cause some concern.

BIRD SPECIES OF SPECIAL CONCERN

BSSC1	=	First Priority
BSSC2	=	Second Priority
BSSC3	=	Third Priority

SPECIES WITH POTENTIAL TO BE AFFECTED CODES

NLAA	=	Not Likely to be Adversely Affected
NE	=	No Effect

References

Adams, Dawn. 2001. Ecologist. Point Reyes National Seashore. Personal communication with Kristin Byrd, Point Reyes National Seashore. June.

Allen, Sarah. 2001. Science Advisor. Point Reyes National Seashore. Personal communication with Kristin Byrd, Point Reyes National Seashore. June.

Allen, Sarah. 2005. Science Advisor. Point Reyes National Seashore. Personal communication with Amelia Ryan, Point Reyes National Seashore. December.

Avocet Research Associates 2002. Giacomini Marsh Restoration Site Special Status Animal Species: Reconnaissance & Compliance. Final Report to the National Park Service, Point Reyes National Seashore.

California Department of Fish and Game. 2005. Natural Diversity Database (NDDB).

California Department of Fish and Game. 2005. Habitat Conservation Planning Branch. California's plants and animal Species Account http://www.dfg.ca.gov/hcpb/species.

Evens, Jules. 2005. Avocet Research Associats. Personal communication with Amelia Ryan, Point Reyes National Seashore. December.

Fellers, Gary. 2001. Research Scientist, Point Reyes National Seashore. Personal communication with Kristin Byrd, Point Reyes National Seashore.

Fellers, Gary. 2005. Research Scientist, Point Reyes National Seashore. Personal communication with Amelia Ryan, Point Reyes National Seashore. December.

Fellers, Gary and Greg Guscio. 2002. Red-legged frog surveys at the Giacomini Wetlands, Point Reyes National Seashore. U.S. Geological Survey, Western Ecological Research Center, Point Reyes National Seashore. Prepared for the National Park Service, Point Reyes National Seashore.

Fong, Darren. 2002. California freshwater shrimp (*Syncaris pacifica*) and tidewater goby (*Eucyclogobius newberryi*) surveys, Giacomini Ranch, Marin Co. Prepared for the Division of Resource Management, Point Reyes National Seashore, National Park Service.

Hafernik, J.E. and D.L. Mead. 1992. Golden Gate National Recreation Area rare insect inventory project. Report prepared for the Golden Gate National Park Association and Division of Planning. Golden Gate National Recreation Area. San Francisco State University, Department of Biology.

Kelly, J. 2001. Distribution and abundance of wintering shorebirds on Tomales Bay, California:implications for conservation. Western Birds 32:145-166.[1]

Ketcham, Brannon. 2001. Hydrologist, Point Reyes National Seashore. Personal communication with Kristin Byrd, Point Reyes National Seashore.

Ketcham, Brannon.2005. Hydrologist, Point Reyes National Seashore. Personal communication with Amelia Ryan, Point Reyes National Seashore. December.

Ketcham, B. J., D. Fong, and Reichmuth M. 2005. Working Draft. Adult Escapement Monitoring Program Summary 2004-2005.. Point Reyes National Seashore, National Park Service.

McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Soc., Berkeley.[2]

Pearson, Jennifer M. 2000. Fish and mysids in two creeks/estuary systems in Marin County, California. Master's Thesis, San Francisco State University, San Francisco, Calif.

Philip Williams and Associates, Ltd., Wetlands Research Associates, Strong Associates, and L.J. Butler. 1993. An evaluation of the feasibility of wetland restoration on the Giacomini Ranch, Marin County (Feasibility Study). Prepared for the National Park Service.

Reichmuth, Micheal. 2005. Fisheries Biologist, Point Reyes National Seashore. Fish Personal communication to Amelia Ryan, Point Reyes National Seashore. December.

Shuford, W.D. 1993. The Marin County Breeding Bird Atlas: a distributional and natural history of coastal California bird Bushtit Pres Bolinas.

Shuford, W.D., and Ryan, T.P. 2000. Nesting populations of California and Ring-billed gulls in California: Recent Surveys and historical status. Western Birds 31: 133-164.[1]

Stenzel, L., S.C. Peaslee, and G. Page. 1981. The breeding status of the snowy plover in California. Western Birds 12:1-40.

Tomales Bay Association. 1995. Fish species of the Tomales Bay watershed. Tomales Bay Watershed. Fall 1995.

USFWS (U.Fish and Wildlife Service). Federal Register 50 CFR 17: November 22, 1994.

U.S. Fish and Wildlife Service. November 18, 2005. Official List of Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in Marin County and Inverness, Tomales, and Point Reyes NE quadrangles. Document Number: 051117042938. Sacramento, CA.

U.S. Fish and Wildlife Service. May 7, 2005. Official List of Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in Marin County and Inverness, Tomales, and Point Reyes NE quadrangles. Document Number: 070507061229. Sacramento, CA.

White, Sean. 2002. Fisheries biologist, William Carmen Wildlife Consulting, Mill Valley, Calif. Personal communication with Lorraine Parsons, Point Reyes National Seashore.

Footnotes

1. Kelly, J. 2001, and Shuford W.D. and Ryan, 2000, references are from within ARA et al. 2002. These works were not independently consulted.
2. McCaskie et al., 1979, reference are from within CDFG: California's plants and animal Species Account . This work was not independently consulted.

Appendix B

Mitigation Monitoring Program Report

MITIGATION MONITORING PROGRAM REPORT

GIACOMINI WETLAND RESTORATION PROJECT
NATIONAL PARK SERVICE
Point Reyes National Seashore/Golden Gate National Recreation Area

CALIFORNIA STATE LANDS COMMISSION

May 17, 2007

Mitigation Monitoring Program

Under the California Environmental Quality Act (CEQA), the lead agency is required to adopt a program for reporting or monitoring regarding the implementation of mitigation measures for the Project, if it is approved, to ensure that the adopted mitigation measures are implemented as defined in this EIS/EIR. The Lead Agency's responsibility originates in Public Resources Code §21081.6(a) (Findings) and the State CEQA Guidelines 14 CCR §15091(d) (Findings) and §15097 (Mitigation Monitoring or Reporting). The adopted mitigation measures and monitoring program would be included as part of the Notice of Determination (NOD) issued under CEQA, as well as, in this case, the Record of Decision (ROD) issued under the National Environmental Policy Act (NEPA). This mitigation monitoring program will also be used by the National Park Service (Park Service), the Point Reyes National Seashore Association (PRNSA), and their cooperators and contractors to track implementation of required mitigation measures within the Project Area.

Monitoring Authority

The purpose of a Mitigation Monitoring Plan (MMP) is to ensure that measures adopted to mitigate or avoid significant impacts are implemented and, once implemented, to evaluate their effectiveness. A MMP will be a working guide to facilitate not only the implementation of mitigation measures by the project proponent, but also the monitoring, compliance, and reporting activities of the Park Service, PRNSA, and monitors they designate.

The Park Service and PRNSA may delegate duties and responsibilities for monitoring to the other environmental monitors or consultants as deemed necessary, and some monitoring responsibilities may be assumed by responsible agencies, such as affected jurisdictions. The number of construction monitors assigned to the project will depend on the number of concurrent construction activities and their locations. The Park Service, PRNSA, or their designee(s), however, will ensure that each person delegated any duties or responsibilities is qualified to monitor compliance. Monitoring identified in this plan will be integrated into the workplans of the site construction manager and environmental monitors, as assigned.

Any mitigation measure study or plan that requires the approval of the Lead Agencies (Park Service and CSLC) must allow for adequate review time. When a mitigation measure requires that a mitigation program be developed during the design phase of the project, the applicant must submit the final program to the Park Service, CSLC, and their designee(s) for review and approval before construction begins. Other involved agencies and jurisdictions may require additional review time. It is the responsibility of the assigned environmental monitor assigned to ensure that appropriate agency reviews and approvals are obtained.

The Park Service, CSLC, or their designee will also ensure that any deviation from the procedures identified under the monitoring program is approved by the Park Service or CSLC. Any deviation and its correction shall be reported immediately to the Park Service, CSLC, or their designee by the assigned environmental monitor.

Enforcement Responsibility

The Park Service and CSLC are responsible for enforcing the procedures adopted for monitoring through the environmental monitor assigned to the project construction. Any assigned environmental monitor shall note problems with monitoring, notify appropriate agencies or individuals without any problems, and report the problems to the Park Service or CSLC or their designee.

Mitigation Compliance Responsibility

The Applicant is responsible for successfully implementing all the mitigation measures in the MMP, and is responsible for assuring that these requirements are met by all of its construction contractors and field personnel. Standards for successful mitigation also are implicit in many mitigation measures that include such requirements as obtaining permits or avoiding a specific impact entirely. Other mitigation measures include detailed success criteria. Additional mitigation success thresholds will be established by applicable agencies with jurisdiction through the permit process and through the review and approval of specific plans for the implementation of mitigation measures.

General Monitoring Procedures

Environmental Monitors. Most of the monitoring procedures will be conducted during the construction phase of the Project. The CSLC, NPS, and the environmental monitor(s) are responsible for integrating the mitigation monitoring procedures into the construction process in coordination with the applicant. To oversee the monitoring procedures and to ensure success, the assigned environmental monitor must be on site during that portion of construction that has the potential to create a significant environmental impact or other impact for which mitigation is require. The environmental monitor is responsible for ensuring that all procedures specified in the monitoring program are followed.

Construction Manager: The construction manager is a representative of the project proponent and interfaces directly with construction personnel. Many of these mitigation activities will be incorporated as part of the construction design and design detail documents. Environmental monitors should work with the construction manager to ensure compliance with the MMP.

Construction Personnel. A key feature contributing to the success of mitigation monitoring will be obtaining the full cooperation of construction personnel and supervisors. Many of the mitigation measures require action on the part of the construction supervisors or crew for successful implementation. To ensure success, the following actions, detailed in specific mitigation measures, will be taken:

- Physical mitigation measures will be documented in the design drawings and specifications. Procedures to be followed by contractors will be written into contracts between the applicant and any construction contractors.
- One or more preconstruction meetings will be held to inform all and train construction personnel about the requirements of the monitoring program.
- A written summary of the mitigation monitoring procedures will be provided to construction supervisors for all mitigation measures requiring their attention.

General Reporting Procedures. Site visits and specified monitoring procedures performed by other individuals (inspectors) will be reported to the environmental monitor assigned to the project. A monitoring record form will be submitted to the environmental monitor by the inspector so that details of the visit can be integrated by the environmental monitor. A checklist and record of mitigation measures will be developed and maintained by the environmental monitor to track all procedures required for each mitigation measure and to ensure that the timing specified for the procedures is adhered to. The environmental monitor will note any problems that may occur and take appropriate action to rectify the problems.

Evaluation of Effectiveness Mitigation. After implementation, the effectiveness of each mitigation measure in reducing or avoiding the intended impact will be evaluated. This evaluation will be performed by the environmental monitor based on the monitoring records, field observations, and other available evidence. This evaluation will be submitted to the Lead Agencies along with recommendations for improving the effectiveness of mitigation measures or monitoring and reporting procedures.

Public Access to Records. The public is allowed to access monitoring records and reports. Monitoring records and reports will be made available by the Park Service, CSLC, or their designees on request.

Mitigation Monitoring Table

The following section presents the mitigation monitoring tables for each environmental impact topic. Two tables – Mitigation Measure and Applicant-Proposed Protective Measures -- are presented on the following pages.

Table columns include the following information:

- Impact or Resource Area (for the Applicant's protective measures);
- Mitigation Measure (Short description of measures required to reduce potentially major or significant impacts to less than major or significant: these are discussed in Chapter 4 of the FEIS/EIR).
- Applicant-Proposed Protective Measures (Short description of measures proposed either in Chapter 2 or Chapter 4 to avoid or minimize impacts that either could have been major if not proposed as part of the Alternative through avoidance and minimization measures described in Chapter 2 or probably would have never been more than moderate in intensity) ;
- Location (where the impact occurs and the measure should be applied);
- Monitoring/reporting action (action to be taken by the monitor or Lead Agency);
- Effectiveness criteria (how the agency can know if the measure is effective);
- Agency responsible for monitoring; and
- Timing (prior to permit**{** XE "permit" **}** approval; before, during, or after construction; during operation, etc.)

Monitoring Program for Mitigation Measures: Note measures are not numbered in FEIS/EIR.

Affected Resource Area	Mitigation Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Air Resources – Air Quality and Noise						
Enhanced control measures to minimize NOx emissions and noise levels in Sensitive Construction Areas.	M-N-1. Construction Contractor shall be provided with information and map of Sensitive Construction Areas prior to start of construction.	Project Area	Environmental Monitor shall provide Construction Manager with map of Sensitive Construction Areas prior to start of construction. Construction Manager will provide to Construction Contractor and discuss constraints in these areas.		NPS/ PRNSA	During Construction – Both years
	M-N-2. Residents adjacent to Sensitive Construction Areas shall be notified in advance of construction starting in these areas.	Project Area	NPS and/or Construction Manager will notify residents or sensitive receptors adjacent to Sensitive Construction Areas at least 1 week prior to start of construction in these areas.	Minimal number of complaints from residents adjacent to Sensitive Construction Areas.	NPS/ PRNSA	During Construction-Both years (Noise)
	M-AQ/N-3. Construction Contractor shall maintain properly tuned equipment. All equipment should have sound control devices no less effective than original equipment and would have muffled exhaust.	Project Area	Construction Contractor shall maintain properly tuned construction equipment. Construction Manager or Environmental Monitor will take note and report to Construction Contractor on equipment that appears excessively loud or emits excessive amounts of emissions.	Observations of construction equipment by Construction Manager or Environmental Monitor.	NPS/ PRNSA	During Construction-Second year (Air Quality); Both years (Noise) – Sensitive Construction Areas
	M-AQ/N-4. Construction Contractor shall limit idling time of construction equipment to 5 minutes.	Project Area	Construction Contractor shall instruct employees to limit idling time of construction equipment o no more than 5 minutes. Equipment shall be turned off after 5 minutes.	Visual observations of construction practices by Construction Manager and/or Environmental Monitor.	NPS/ PRNSA	During Construction-Second year (Air Quality); Both years (Noise) – Sensitive Construction Areas

Monitoring Program for Mitigation Measures: Note measures are not numbered in FEIS/EIR.

Affected Resource Area	Mitigation Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
	M-AQ/N-5. Construction Contractor shall limit the number of hours of construction operation or the number of pieces of concurrently operating equipment	Project Area	Sound levels within Sensitive Construction Areas during construction may be monitored by Construction Manager or Environmental Monitor to better determine optimal number of pieces of construction equipment that can be operated.	Visual observations by Construction Manager and/or Environmental Monitor. Sound levels within Sensitive Construction Area during construction are estimated to be less than 75 dBA.	NPS/ PRNSA	During Construction-Second year (Air Quality); Both years (Noise) – Sensitive Construction Areas
	M-N-6. Construction Contractor shall limit hours of construction in Sensitive Construction Areas to 8 a.m. to 6 p.m. Monday through Friday, with weekends authorized only by permission from the NPS or CSLC.	Project Area	Construction Manager and Environmental Monitor will monitor hours of construction in Sensitive Construction Areas.	Minimal number of complaints from residents adjacent to Sensitive Construction Areas.	NPS/ PRNSA	During Construction-Both years (Noise) – Sensitive Construction Areas
Public Services – Municipal Water Supply						
Measures to avoid or minimize impacts to NMWD municipal groundwater supply operations	M-WS-1. Lead Agencies shall not implement major restoration actions in Olema Marsh until: 1) further study shows that increase in salinities in Lagunitas Creek would not have more than minor adverse effect on chloride concentrations in alluvial aquifer and NMWD operations; 2) further study shows that major restoration actions in Olema Marsh would not have more than a minor effect on salinities in upstream portions of Lagunitas Creek; or 3)	Project Area	NPS will work with NMWD and its consultants to further study the relationship between Lagunitas Creek and the alluvial aquifer and the potential effect that restoration of Olema Marsh might have on salinity dynamics in upstream portions of Lagunitas Creek. As it has already been doing, NPS would continue to meet with NMWD to update the agency on the results of studies and computer modeling efforts performed by its consultants. NPS would continue to support NMWD in its efforts to develop a more	Delay of major restoration actions in Olema Marsh should cause no change in salinity structure of upstream portions of Lagunitas Creek or NMWD operations relative to existing conditions.	NPS	Construction and Post-Construction

Monitoring Program for Mitigation Measures: Note measures are not numbered in FEIS/EIR.

Affected Resource Area	Mitigation Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
	NMWD establishes a well that can be used for off-tide pumping. Major restoration actions specifically refer to replacement of culverts at Levee and Bear Valley Roads.		reliable approach to water supply for West Marin			
	M-WS-2. Lead Agencies shall not pursue less intensive restoration actions for Olema Marsh unless additional study and hydrodynamic modeling efforts definitely suggest that these restoration actions would not have more than a minor adverse effect on salinities in upstream portions of Lagunitas Creek and/or NMWD operations. Less intensive restoration actions could include removal or breaching of berm or shallow excavation of Bear Valley Creek channel in Olema Marsh.	Project Area	NPS will work with its consultants to identify less intensive restoration actions that can be undertaken without causing more than a minor increase in salinities in Lagunitas Creek and/or minor adverse effect on NMWD operations. NPS will meet with NMWD staff to discuss restoration actions prior to implementation. NPS staff or designee will monitor salinities in Lagunitas Creek near confluence with Bear Valley Creek and up to Coast Guard wells to determine effect of these actions on salinity structure of upstream portions of Lagunitas Creek.	No more than a minor increase in salinities in upstream portions of Lagunitas Creek; or no more than a minor adverse effect on NMWD operations.	NPS	Construction and Post-Construction

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Soil Resources						
Minimize potential for contamination of sediments by chemicals associated with construction	P-SR-1. An approved Spill Prevention and Response Plan will be developed by the construction contractor; approved by the lead agencies; and implemented by the contractor. Plan should include: 1) spill cleanup procedures; 2) worker training; and 3) impact avoidance measures, including those described below.	Project Area	Confirm approval of the Spill Prevention and Response Plan prior to construction activities. Monitor spill clean-up for compliance with all applicable plan procedures.	Copy of the Spill Prevention and Response Plan is readily accessible, and visual inspection indicates items are properly followed.	NPS/ PRNSA	Prior to start of construction and during construction-Both years.
	P-SR-2. Staging and storage areas for equipment and materials shall be 100 feet away from surface waters.	Project Area	Staging and storage areas will be designated during design phase. Construction Manager and Environmental Monitor will work with contractor to designate other appropriate areas, as needed.	Visual inspection	NPS/ PRNSA	Final Design; Construction-Both years.
	P-SR-3. No fueling or maintenance of vehicles below Ordinary High Water mark of creeks.	Project Area	See P-SR-2	Visual inspection	NPS/ PRNSA	Final Design; Construction-Both years.
	P-SR-4. No equipment is operated in flowing waters without installation of water diversion facilities.	Project Area	Prior to construction, implementation of construction elements will be discussed to determine whether equipment will need to operate in flowing waters and, if so, appropriate BMPs for avoiding impacts.	Visual inspection	NPS/ PRNSA	Prior to Construction and During Construction – Both years.
Air Quality						
Enhanced control measures to	P-AQ-1. Require trucks hauling materials to cover	Project Area	Construction Manager or Environmental Monitor shall	Visual inspection	NPS/ PRNSA	During construction-

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
minimize dust and pollutant emissions.	trucks or require them to maintain at least 2 feet of freeboard.		inspect trucks to ensure loads are covered prior to leaving work site.			Both years.
	P-AQ/VR-2. Wash tires or tracks of trucks and equipment entering and leaving project sites to limit dust on roads.	Project Area	Establish wash station for trucks tires leaving and arriving at the Project Area. Random inspections by Construction Manager or Environmental Monitor	Visual inspection, operation of tire spray station.	NPS/ PRNSA	During construction- Both years.
	P-AQ-3. Sweep streets daily where visible soils are carried on to public streets.	Paved Roads adjacent to Project Area	Construction Manager or Environmental Monitor shall inspect adjacent roads, ensure excess soils are removed	Visual inspection	NPS/ PRNSA	During construction- Both years.
	P-AQ-4: Enclose, cover, water, or apply non-toxic soil stabilizers to stockpiles as necessary.	Project Area	Construction Manager work with contractor to determine fate and condition of stockpiles	Coordination and visual inspection	NPS/ PRNSA	During construction- Both years.
	P-AQ-5: Apply non-toxic soil stabilizers to inactive earthwork areas (inactive for 10 days or more)	Project Area	Environmental manager work with contract oversight to determine fate and condition of inactive work areas	Coordination and visual inspection	NPS/ PRNSA	During construction- Both years.
	P-AQ-6. Limit traffic speeds on unpaved roads to 10 mph	Project Area	Construction Manager shall observe speeds of trucks on unpaved roads and notify contractor of trucks exceeding speed limit.	Visual inspection	NPS/ PRNSA	During construction- Both years.
Water Resources - Water Quality						
Measures to minimize and avoid impacts to water quality	P-WQ-1. Conduct construction activities during the dry season	Project Area	Construction scheduling would be conducted to minimize potential for activities to occur during wet season.	Visual inspection	NPS/ PRNSA	Before and During construction- Both years.
	P-WQ-2. Prepare Stormwater Pollution Prevention Plan that details how construction would be	Project Area	Construction Contractor will prepare Stormwater Pollution Prevention Plan and submit to Park Service and PRNSA for	Document Review and Approval; Visual Inspection of construction activities	NPS/ PRNSA	Prior to Construction and During Construction-

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
	conducted in accordance with measures to decrease delivery of sediment to surface waters. Construction Contractor will adhere to measures outlined in approved SWPP, which should include measures outlined below.		approval. Construction Manager and Environmental Monitor will ensure that Construction Contractor adheres to SWPP.	around surface waters		Both years
	P-WQ-3. Ensure that concentrated run-off and concentrated discharge are diverted away from channel banks	Project Area	Construction Manager and Environmental Monitor will ensure that Construction Contractor adheres to SWPP.	Visual Inspection of construction activities around surface waters	NPS/ PRNSA	During construction-Both years.
	P-WQ-4. Install temporary construction fencing to identify areas that will be cleared, graded, recontoured, or revegetated.	Project Area	Construction Manager and Environmental Monitor will ensure that Construction Contractor adheres to SWPP.	Visual Inspection of construction activities around surface waters	NPS/ PRNSA	During construction-Both years.
	P-WQ-5. Grade and stabilize soils to minimize erosion and sediment input into adjacent surface waters	Project Area	Construction Manager and Environmental Monitor will ensure that Construction Contractor adheres to SWPP.	Visual Inspection of construction activities around surface waters	NPS/ PRNSA	During construction-Both years.
	P-WQ-6. Implement erosion control measures where appropriate to prevent sediment from entering surface waters, including silt fencing, fiber rolls, or erosion control blanket	Project Area	Construction Manager and Environmental Monitor will ensure that Construction Contractor adheres to SWPP.	Visual Inspection of construction activities around surface waters	NPS/ PRNSA	During construction-Both years.
	P-WQ-7. Avoid operating equipment in flowing waters by using temporary cofferdams or other water bypass procedures to divert flow around construction area.	Project Area	Construction Manager and Environmental Monitor will ensure that Construction Contractor adheres to SWPP.	Visual Inspection of construction activities around surface waters	NPS/ PRNSA	During construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Vegetation Resources – Wetlands, Riparian, Special Status Species, and Invasives						
Measures to minimize and avoid impacts to vegetation – General and Invasives	P-VR-1. Use temporary construction fencing to delimit work areas. Exclude foot and vehicle traffic from sensitive areas using fencing and flagging.	Project Area	Ensure that construction contractor clearly delineates work areas with construction fencing and that work areas are identified correctly.	Visual inspection	NPS/ PRNSA	Final Design; Before and During Construction- Both years.
	P-AQ/VR-2. Wash tires or tracks of trucks and equipment entering and leaving project sites to prevent seed transport.	Project Area	Ensure clean equipment arrives at the site. Establish wash station for trucks tires leaving and arriving at the Project Area.	Visual inspection; Operation of tire spray station.	NPS/ PRNSA	Before and during construction activities.
	PR-VR-3. Removal or limbing of riparian vegetation should be avoided. No riparian vegetation shall be removed or limbed without express approval from the Environmental Monitor.	Project Area	Construction Contractor will work with Environmental Monitor to ensure that impacts to riparian vegetation are avoided or minimized to the extent possible. Environmental Monitor will work with Construction Contractor to clearly mark trees approved for removal or limbing.	Visual inspection	NPS/ PRNSA	During Construction- Both years.
Measures to minimize and avoid impacts to vegetation – Wetland and riparian resources	P-VR-4. Staging and stockpiling of equipment and materials shall be in upland and non-riparian areas whenever possible.	Project Area.	Lead agencies will review and approve staging areas identified in Final Design. Construction Manager and Environmental Monitor will inspect staging areas established by Construction Contractor. Contractor will request permission prior to establishing new staging and stockpile areas not identified in specifications.	Review construction specifications; Visual inspection of work areas and confirmation of staging and stockpile areas	NPS/ PRNSA	Final Design; Before and During Construction- Both years.
	If stockpiling and staging and access must occur in wetland or riparian areas, following measures should be implemented:	Project Area.	Lead agencies will review and approve staging areas identified in Final Design. Construction Manager and Environmental Monitor will inspect staging and	Review construction specifications; Visual inspection of flagged stockpile and staging and access road	NPS/ PRNSA	Final Design; Before, During, and After Construction-

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
	• P-VR-5. Temporary impacts should be minimized to the extent possible by minimizing work area and road width. • P-VR-6. Contractor will demarcate stockpiling and staging areas and access roads in wetlands and riparian areas with construction fencing and/or flagging. • P-VR-7. All temporary fill will be removed at the end of construction.		stockpile areas and access roads demarcated by flagging by Construction Contractor. Contractor will request permission prior to establishing new staging and stockpile areas and access roads not identified in specifications.	areas to ensure appropriate siting prior to initiation of earthmoving; Visual inspection throughout construction to ensure no new impacts and after construction to ensure that all temporary fill is removed.		Both years.
	P-VR-8. Construction access routes shall be flagged to ensure that construction equipment does not detour or widen access roads into wetlands or riparian habitat without prior permission.	Project Area.	Lead agencies will review and approve access routes identified in Final Design. Construction Manager and Environmental Monitor will inspect access roads demarcated by flagging by Construction Contractor. Contractor will request permission prior to establishing new access roads not identified in specifications.	1) Review construction specifications; 2) Visual inspection of flagged access roads to ensure appropriate siting prior to initiation of earthmoving; 3) Visual inspection to ensure that access does not deviate from approved routes.	NPS/ PRNSA	Final Design; Before and During Construction-Both years.
	P-VR-9. Where possible, construction equipment shall operate in upland locations	Project Area	Construction Manager and Environmental Monitor will work with Construction Contractor to identify most environmentally feasible construction approaches. Contractor will request permission prior to operating in wetland locations that were not previously approved.	Visual inspection of construction operations	NPS/ PRNSA	During Construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Measures to minimize and avoid impacts to vegetation – Special status species	P-VR-10. Construction in areas with special status plant species shall be delayed to avoid most of the season of reproduction, which, for most species, would be approximately July-August. Areas with special status plant species shall be flagged.	Project Area	Construction Manager and Environmental Monitor will work with Construction Contractor to identify scheduling of actions in areas with special status species. Environmental Monitor will flag areas with special status plant species prior to initiation of construction in these areas and will discuss flagging scheme with Construction Manager and Contractor. Contractor will request permission prior to operating in areas identified as having special status species.	Pre-construction meetings with contractor; Visual inspection of construction operations.	NPS/ PRNSA	Prior to and During Construction-Both years.
	P-VR-11. Construction Contractors shall excavate and stockpile topsoils in flagged areas with special status plant species. Topsoils should be replaced in designated areas after construction is completed. In affected areas where topsoil salvage is not possible, seeds would be collected and stored for dispersal after completion of construction activity.	Project Area	Lead agencies will review and approve plans for salvaging and stockpiling topsoils in areas with special status species in Final Design. Environmental Monitor will flag areas with special status species identified for salvage and will discuss flagging scheme with Construction Manager and Contractor. Where topsoil salvage not possible, Environmental Monitor or designee will collect seeds when ripe and store for dispersal once construction is completed. Construction Manager and/or Environmental Monitor will inspect salvage, stockpiling, and topsoil replacement operations to ensure performed properly.	Lead Agencies review and approve salvage and stockpiling elements of Final Design; Visual inspection of salvage, stockpiling, and topsoil replacement operations.	NPS/ PRNSA	Prior to and During Construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Fish and Wildlife Resources – General Wildlife and Special Status Species						
Measures to minimize and avoid impacts to fish and wildlife resources – Breeding and migratory birds	P-FWR-1. Pre-construction surveys shall be conducted no more than 1 week prior to start of construction in specified construction areas. Pre-construction surveys required for work between March 1 and August 15.	Project Area	Qualified avian biologist designated by NPS or PRNSA will conduct pre-construction avian surveys no more than 1 week prior to start of construction in specified areas and will report results in memo format to Environmental Monitor.	Review of submitted memos to ensure that timing and areal extent of surveys sufficient to ensure compliance.	NPS/ PRNSA	Prior to Construction
	P-FWR-2. Construction Contractor shall stay at least 100 feet away from any area identified as having nesting or breeding migratory birds until August 15.	Project Area	Construction Manager will inform Construction Contractor of identified nesting areas and provide maps prepared by Environmental Monitor showing 100-foot boundary.	Visual inspection of construction operations to ensure compliance with 100-foot boundary.	NPS/ PRNSA	During Construction-Both years.
Measures to minimize and avoid impacts to fish and wildlife resources – Aquatic species	P-FWR-3. Before any construction or potential de-watering activities begin in any creeks within the Project Area, the Park Service and PRNSA shall ensure that native aquatic vertebrates and larger invertebrates are relocated out of the construction area by a qualified fisheries biologist.	Project Area	Qualified fisheries biologist will relocate aquatic species from open water areas subject to construction through seining and other appropriate measures to point at which it can be assumed that almost all individuals have been caught. Water levels may be lowered to improve efficiency of trapping. Individuals would be kept in buckets with aerators until relocated to flowing stream segments not subject to construction identified by the NPS in consultation with the appropriate agencies. Fisheries biologists would report findings to Environmental Monitor, who would oversee activities. Environmental Monitor would inform Construction Manager when areas are cleared.	1) Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance; 2) Inspection and clearance by Environmental Monitor prior to initiating construction or dewatering activities; 3) Visual inspection of construction operations to ensure that construction and dewatering are not initiated prior to clearance.	NPS/ PRNSA	Prior to Construction and During Construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Fish and Wildlife Resources – General Wildlife and Special Status Species						
Measures to minimize and avoid impacts to fish and wildlife resources – California black rail and California clapper rail	P-FWR-4. Qualified avian biologist shall conduct pre-construction surveys in spring to locate active nests in suitable breeding habitat using survey methods approved by CDFG[1] and USFWS[2].	Project Area	Qualified avian biologist shall conduct surveys and report findings to Environmental Monitor. Environmental Monitor shall report findings to CDFG and USFWS.	Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance	NPS/ PRNSA	Prior to Construction-Both years.
	P-FWR-5. Construction Contractor shall stay at least 250 feet away from established rail breeding habitat between February 1 and August 31.	Project Area	Environmental Monitor will provide Construction Manager with maps showing extent of 250-foot boundary at least 1 month prior to start of construction. Construction Manager will provide maps to Construction Contractor prior to start of construction.	Visual observation of construction activities to ensure that 250-foot boundary is observed.	NPS/ PRNSA	Prior to and During Construction-Both years.
Measures to minimize and avoid impacts to fish and wildlife resources – California red-legged frog and Northwestern pond turtle	P-FWR-6. Qualified amphibian biologist shall conduct pre-construction surveys in spring to locate extent of breeding habitat using survey methods approved by USFWS[2].	Project Area	Qualified amphibian biologist shall conduct surveys and report findings to Environmental Monitor. Environmental Monitor shall report findings to CDFG and USFWS.	Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance	NPS/ PRNSA	Prior to Construction-Both years.
	P-FWR-7. Construction Contractor shall avoid construction in or directly adjacent to red-legged frog breeding habitat until after July 31.	Project Area	Environmental Monitor will provide Construction Manager with maps showing breeding areas off-limit to construction at least 1 month prior to start of construction. Construction Manager will provide maps to Construction Contractor prior to start of construction.	Visual observation of construction activities to ensure that specified breeding areas are avoided.	NPS/ PRNSA	Prior to and During Construction-Both years.

[1] CDFG=California Department of Fish and Game
[2] USFWS=U.S. Fish and Wildlife Service

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Fish and Wildlife Resources – General Wildlife and Special Status Species						
	P-FWR-8. No more than 1 week prior to start of construction or dewatering activities in open water areas, qualified biologist shall conduct pre-construction surveys to determine whether red-legged frogs and northwestern pond turtle are present. If present, frogs and turtles shall be trapped and relocated to non-construction areas approved in advance by Environmental Monitor in consultation with appropriate technical experts and/or agencies.	Project Area	Qualified biologist will capture and relocate red-legged frogs and northwestern pond turtle from open water areas subject to construction through appropriate trapping measures to point at which it can be assumed that almost all individuals have been caught. Water levels may be lowered to improve efficiency of trapping. Individuals would be kept in moist dark coolers until relocated to appropriate habitat not subject to construction identified by the NPS in consultation with the appropriate technical experts and/or agencies. Biologists will report findings to Environmental Monitor, who will oversee activities. Environmental Monitor will inform Construction Manager when areas are cleared.	1) Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance; 2) Inspection and clearance by Environmental Monitor prior to initiating construction or dewatering activities; 3) Visual inspection of construction operations to ensure that construction and dewatering are not initiated prior to clearance.	NPS/ PRNSA	Prior to Construction and During Construction-Both years.
Measures to minimize and avoid impacts to fish and wildlife resources – Tidewater goby	P-FWR-9. Qualified fisheries biologist shall conduct pre-construction surveys in spring to locate extent of tidewater goby habitat using survey methods approved by USFWS[2].	Project Area	Qualified fisheries biologist shall conduct surveys and report findings to Environmental Monitor. Environmental Monitor shall report findings to USFWS.	Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance	NPS/ PRNSA	Prior to Construction-Both years.
	P-FWR-10. Construction Contractor shall avoid construction in or directly adjacent to established tidewater goby habitat from	Project Area	Environmental Monitor will provide Construction Manager with maps showing established goby habitat off-limit to construction at least 1 month	Visual observation of construction activities to ensure that specified goby habitat	NPS/ PRNSA	Prior to and During Construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
	April through June.		prior to start of construction. Construction Manager will provide maps to Construction Contractor prior to construction.	areas are avoided.		
	P-FWR-11. No more than 1 week prior to start of construction or dewatering activities in open water areas, qualified fisheries biologist shall conduct pre-construction surveys to determine whether goby is present. If present, goby shall be trapped and relocated to non-construction areas approved in advance by Environmental Monitor in consultation with appropriate technical experts and/or agencies such as Tomasini Creek.	Project Area	Qualified fisheries biologist will capture and relocate goby from open water areas subject to construction through extensive seining, minnow trapping, and other appropriate trapping measures to point at which it can be assumed that almost all individuals have been caught. Water levels may be lowered to improve efficiency of trapping. Individuals would be kept in buckets with aerators until relocated to appropriate habitat not subject to construction identified by the NPS in consultation with appropriate experts and/or agencies. Fisheries biologists will report findings to Environmental Monitor, who will oversee activities. Environmental Monitor will inform Construction Manager when areas cleared.	1) Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance; 2) Inspection and clearance by Environmental Monitor prior to initiating construction or dewatering activities; 3) Visual inspection of construction operations to ensure that construction and dewatering are not initiated prior to clearance.	NPS/ PRNSA	Prior to Construction and During Construction-Both years.
Measures to minimize and avoid impacts to fish and wildlife resources – Salmonids	P-FWR-12. Construction Contractor shall avoid conducting construction activities in Lagunitas Creek and other known salmonid-supporting streams until after July 15.	Project Area	Environmental Monitor will provide Construction Manager with maps showing established salmonid habitat off-limit to construction at least 1 month prior to start of construction. Construction Manager will provide maps to Construction Contractor prior to construction.	Visual observation of construction activities to ensure that specified salmonid habitat areas are avoided.	NPS/ PRNSA	Prior to and During Construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Fish and Wildlife Resources – General Wildlife and Special Status Species						
Measures to minimize and avoid impacts to fish and wildlife resources – California freshwater shrimp	P-FWR-13. Qualified biologist shall conduct pre-construction surveys in areas with appropriate habitat to determine whether shrimp are present using approved survey methods.	Project Area	Qualified biologist shall conduct surveys and report findings to Environmental Monitor. Environmental Monitor shall report findings to USFWS.	Review of submitted memos to ensure that timing and areal extent of relocation efforts sufficient to ensure compliance	NPS/ PRNSA	Prior to Construction-Both years.
Cultural Resources						
Measures to minimize and avoid impacts to undocumented cultural resources	P-CR-1. Lead Agencies shall ensure that NPS or Federated Indians of Graton Rancheria (FIGR) representative is on call during construction activities.	Project Area	Environmental Monitor should communicate cultural resource contacts to Construction Manager.	Appropriate response in case cultural resources are found on site.	NPS/ PRNSA	During Construction-Both years.
	P-CR-2. Construction Contractor shall stop construction activities and immediately notify Construction Manager should construction activities uncover potential cultural resource findings such as shells, pottery fragments, bones, or other historic or archaeological artifacts.	Project Area	Construction Contractor will communicate possible cultural resource findings immediately to Construction Manager, who will contact NPS or FIGR on-call representative.	Appropriate response in case cultural resources are found on site.	NPS/ PRNSA	During Construction-Both years.
Public Health and Safety – Disease and Disease Vectors						
Measures to minimize and avoid impacts to public health and safety from disease vectors	P-PH-1. Construction Contractor shall avoid temporary water impoundment or minimize the areal extent of water impoundment caused by construction activities to reduce breeding of mosquitoes.	Project Area	Construction Contractor will work with Construction Manager and Environmental Monitor prior to start of construction to determine the need and extent for water diversion and impoundment measures that could create temporary breeding habitat for mosquitoes.	Visual observation of construction activities to ensure that amount of temporary water impoundment does not exceed that discussed prior to construction.	NPS/ PRNSA	Prior to and During Construction-Both years.

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
Public Health and Safety – Disease and Disease Vectors						
Measures to minimize and avoid impacts to public health and safety from disease vectors	P-PH-2. NPS or designee shall monitor temporary impounded areas during construction for evidence of excessive mosquitoes or mosquito breeding and, if necessary, treat with NPS-approved IPM[3] management and treatment methods.	Project Area and Vicinity	Environmental Monitor will work with NPS or designee on monitoring of temporary impounded areas for evidence of excessive mosquitoes or mosquito breeding. Environmental Monitor will notify Construction Manager and Contractor if management or treatment is required.	Re-testing of impounded areas after implementation of management or treatment shows absence or highly reduced numbers of mosquitoes. Minimal number of complaints from surrounding residents and/or visitors.	NPS/ PRNSA	During Construction-Both years.
Public Services – Municipal Water Supply Distribution and Other Services						
Measures to minimize and avoid impacts to public services from interruption of public services	P-PS-1. NPS and Construction Manager shall provide advance notification to affected residents of any utility interruptions at least 1 week prior to occurrence.	Project Area and Vicinity	NPS shall prepare mailing for affected residents in consultation with Construction Manager and Contractor at least 1 week prior to planned interruption in utility.	Minimal number of complaints from affected residents.	NPS/ PRNSA	During Construction-Both years.
Public Services – Traffic and Transportation						
Measures to minimize and avoid impacts to transportation	P-TR-1. Engineer and Construction Contractor shall be required to develop and implement traffic safety plan that would include limits on vehicle size; approved access and hauling routes; approved traffic control procedures for road or lane closures, traffic stoppages, detours, flag-person requirements, and turnout needs.	Project Area and adjacent areas	Project Engineer shall include approved access and hauling routes on construction specifications and include information on minimum or suggested traffic control measures as part of specifications. Construction Contractor shall incorporate information from Engineer into Traffic Safety Plan, which will be submitted to Construction Manager and Environmental	1) Review and approval of proposed access and hauling routes and traffic control measures in construction specifications. 2) Review and approval of Traffic Safety Plan. 3) Visual observation of access, hauling, and traffic control	NPS/ PRNSA	Before and During Construction-Both years.

[3] IPM=Integrated Pest Management

Monitoring Program for Applicant-Proposed Protective Measures

Affected Resource Area	Applicant-Proposed Protective Measures	Location	Monitoring / Reporting Action	Effectiveness Criteria	Respons-ible Agency	Timing
			Monitor for review and approval prior to start of construction. Traffic control measures will be submitted to County of Marin Public Works for approval. Construction Contractor shall adhere to the approved Traffic Safety Plan during entire construction period.	procedures.		
	P-TR-2. Construction Contractor shall observe weight limits suggested for County of Marin Roads to limit wear and tear on County, state, and NPS roads. Construction Contractor shall not use hauling trucks whose capacity exceeds weight limit of County of Marin roads.	Project Area and adjacent areas	Construction Contractor will have equipment on hauling trucks that allows load weight of hauling trucks to be checked on random basis by Construction Manager or designee. Construction Manager will maintain records of all such checks. In addition, Construction Manager or designee may perform video-monitoring of selected portions of roads to document condition prior to initiation of hauling.	Random checks by Construction Manager show that hauling vehicles within approved weight limits. Video-monitoring, if performed, shows that condition of roads does not decrease substantially after hauling is completed relative to existing conditions.	NPS/ PRNSA	Before and During Construction-Both years.
Public Access Resources						
Measures to minimize and avoid impacts to public access resources	P-PA-1. NPS and Construction Manager shall provide advance notification regarding any trail and road closures or detours to visitors and residents.	Project Area and Vicinity	NPS shall post information on trail and road closures and detours that could affect access to public access resources on 1) the park website, 2) at the Bear Valley Visitor Center, and 3) at the construction site.	Minimal number of complaints from affected residents.	NPS/ PRNSA	During Construction-Both years.

Intentionally left blank

Appendix C

Land Evaluation and Site Analysis Summary Report

Giacomini Wetland Restoration Project
Land Evaluation and Site Assessment
Analysis Summary Report

Point Reyes National Seashore
Point Reyes Station, CA

April 23, 2007

Summary

Point Reyes National Seashore (Seashore) has proposed the restoration of natural hydrologic and ecological processes to approximately 600 acres at the head of Tomales Bay. The largest portion of the Project Area -- approximately 550 acres -- is represented by the Waldo Giacomini Ranch property (Giacomini Ranch). The Giacomini Ranch was sold to the National Park Service (Park Service) in 2000 and was operated as a dairy by the Giacomini family under a Reservation of Use agreement with the Park Service until 2006. The Giacomini Ranch was once part of an integrated tidal wetland complex that was leveed for operation of a dairy in 1946. Since then, a majority of the ranch lands has remained wetland, although functionality has been reduced by the lack of hydraulic connectivity. The Land Evaluation and Site Assessment (LESA) system developed by the California Department of Conservation in 1997 is used to determine the impact of farmland conversion associated with the proposed project. The document summarizes the LESA rating and scoring factors for two potential outcomes related to agriculture under the proposed project. All of the alternatives involve closure of the dairy and cessation of agricultural management practices. Under the No Action Alternative, which involves a small bit of restoration (~11 acres) to satisfy mitigation obligations associated with funds received to purchase and restore the ranch, there is the potential for leased grazing of dairy heifers or beef cattle on the remainder of the property. Conversely, there would be no potential for leased grazing under any of the Action Alternatives, and the No Action Alternative may be implemented without leased grazing. ***The result of this analysis shows that neither outcome proposed under the Giacomini Wetland Restoration Project is considered significant under California Environmental Quality Act (CEQ) or major under National Environmental Policy Act (NEPA).*** The Giacomini Wetland Restoration Final EIR/EIS includes complete environmental impact interpretation related to farmland conversion.

Introduction

National Resources Conservation Service (NRCS) uses a Land Evaluation and Site Assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of federally funded and assisted projects. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. A similar system has been developed for California by the State Department of Conservation, which oversees California's Farmland Monitoring and Mapping Program. This program was established in 1982 to assess the location, quality, and quantity of agricultural lands and conversion of these lands over time. FMMP is a non-regulatory program and provides an analysis of agricultural land use and land use changes throughout California every two years. The formulation of a California Agricultural LESA Model is the result of Senate Bill 850 (Chapter 812 /1993), which charges the Resources Agency, in consultation with the Governor's Office of Planning and Research, with developing an amendment to

Appendix G of the California Environmental Quality Act (CEQA) Guidelines concerning agricultural lands. Such an amendment is intended "to provide lead agencies with an optional methodology to ensure that significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process" (Public Resources Code Section 21095).

The California Agricultural LESA Model is composed of six different factors. The first two are Land Evaluation factors (LE Factors), which measure the inherent soil-based qualities of land as they relate to agricultural suitability. The remaining four are Site Assessment factors (SA Factors), which provide measures of a given project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. The LESA evaluates each of these factors separately, with ratings based on a 100 point scale. The factors are then weighted relative to one another and combined, resulting in a single numeric score for a given project, with a maximum attainable score of 100 points. The Project LESA score becomes the basis for making a determination of the intensity or significance of a project's impacts, based upon a range of established scoring thresholds.

As part of the Giacomini Wetland Restoration Project, a LESA has been performed to evaluate the potential impacts of the proposed restoration on agricultural land use in the area.

Project Background

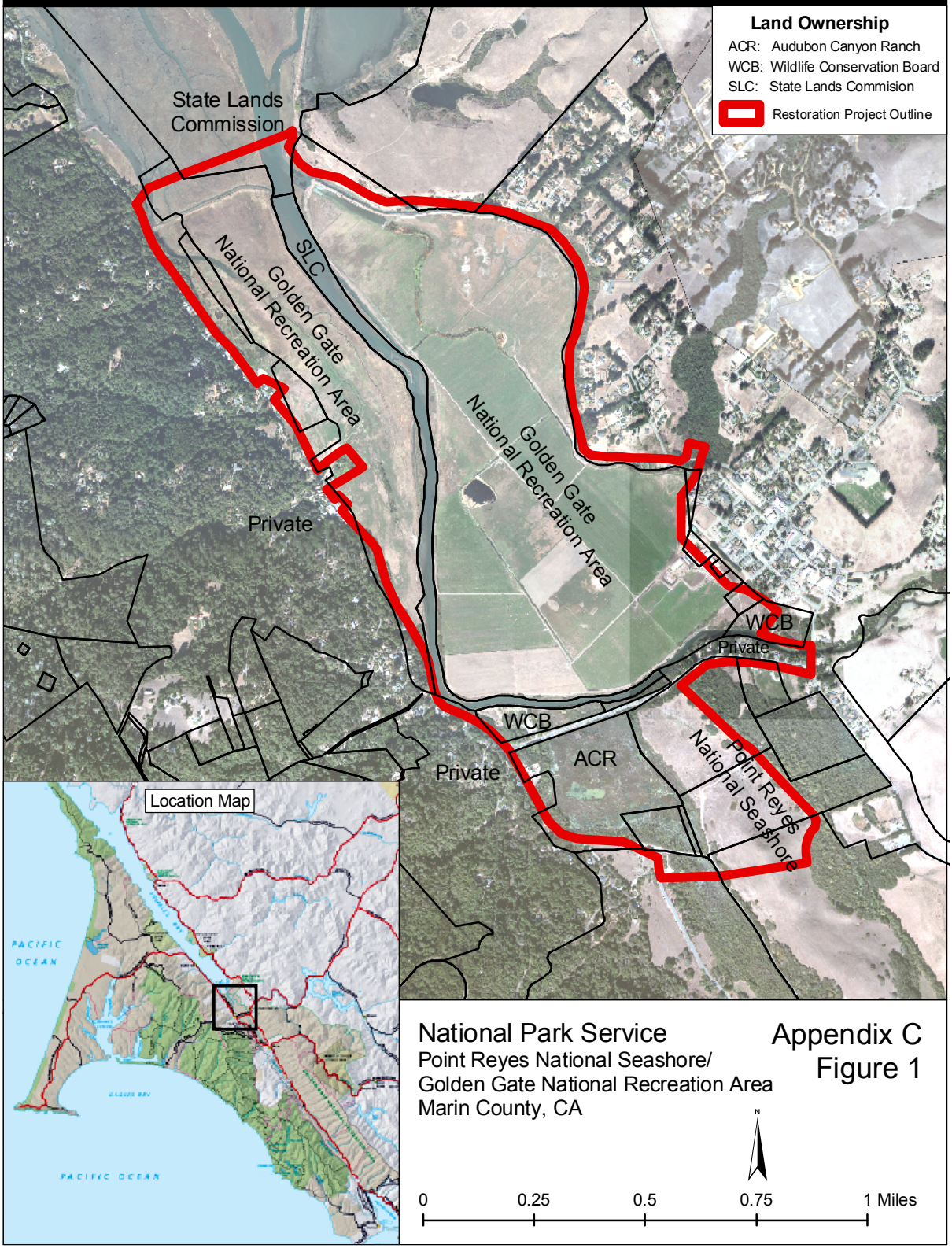
The Giacomini Wetland Restoration Project proposes to convert and restore natural hydrologic and ecological processes to approximately 600 acres in western Marin County, at the head of Tomales Bay (Figure C-1). The largest portion of the Project Area -- approximately 550 acres -- is represented by the Waldo Giacomini Ranch property (Giacomini Ranch). The Giacomini Ranch was once part of an integrated tidal wetland complex. Small-scale dairy ranching occurred on portions of these wetlands starting in the early 1900s, as Point Reyes had gained preeminence in the late 1800s for its dairy and beef cattle ranching, with its cream and butter products commanding top dollar in San Francisco. At the end of World War II, the Waldo Giacomini family assumed ownership of the Filippini dairy and, in 1946, built levees on either side of Lagunitas Creek – referred to as the East and West Pastures – for operation of a dairy ranch. Since then, a majority of the ranch lands has remained wetland, although functionality has been reduced by the lack of hydraulic connectivity.

Point Reyes had been the object of land protection efforts since the first park feasibility study was authorized in the 1930s. Point Reyes National Seashore (Seashore) was established in 1963. Almost 10 years later, the Golden Gate National Recreation Area (GGNRA) was established directly adjacent to the Seashore. Expansion of GGNRA's boundaries in the 1980s resulted in incorporation of the Giacomini Ranch and other areas in northern Olema Valley and the eastern Tomales Bay shoreline and opened the door to the Park Service entering into discussions and negotiation with the Giacomini family about purchase of the ranch. However, it was not until the California Department of Transportation approached the National Park Service (Park Service) about transferring its mitigation obligations for a road repair on State Route 1 in exchange for monies to purchase and restore the ranch did acquisition of the ranch become feasible. The Giacomini Ranch was sold to the Park Service in 2000 and was operated as a dairy by the Giacomini family under a Reservation of Use agreement with the Park Service until 2006.

In the interim, the Park Service and the lead agency under CEQA, the California State Lands Commission, have been conducting an extensive planning effort to restore natural hydrologic and ecological processes and functions to the former coastal marsh. There are four Action Alternatives and one No Action Alternative. Under these alternatives, there are two potential outcomes related to

Project Area

Giacomini Wetland Restoration Project



National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

Appendix C
Figure 1

N

0 0.25 0.5 0.75 1 Miles

agriculture. All of the alternatives involve closure of the dairy and cessation of agricultural management practices. Under the No Action Alternative, which involves a small bit of restoration (~11 acres) to satisfy mitigation obligations associated with funds received to purchase and restore the ranch, there is the potential for leased grazing of dairy heifers or beef cattle on the remainder of the property. Conversely, there would be no potential for leased grazing under any of the Action Alternatives, and the No Action Alternative may be implemented without leased grazing. These two outcomes are what is analyzed under LESA.

Methods

The LESA analysis was performed by Park Serivce Seashore staff following published methods (California Department of Conservation 1997). All acreage analysis and mapping was conducted using ESRI's ArcGIS 9.1 Geographic Information Systems software.

Analytical methodology for the LESA is summarized for each of the six Factors, below.

Land Evaluation Factors

Factor 1) USDA Land Capability Classification (LCC) **-** The LCC indicates the suitability of soils for most kinds of crops. Groupings are made according to the limitations of the soils when used to grow crops and the risk of damage to soils when they are used in agriculture. The current LCC includes eight classes of land designated by Roman numerals I thru VIII. Soils having the fewest limitations receive the highest rating (Class I). The first four classes are arable land--suitable for cropland--in which the limitations on their use and necessity of conservation measures and careful management increase from I thru IV. The criteria for placing a given area in a particular class involve the landscape location, slope of the field, depth, texture, and reaction of the soil. The remaining four classes, V thru VIII, are not to be used for cropland, but may have uses for pasture, range, woodland, grazing, wildlife, recreation, and aesthetic purposes. Within the broad classes are subclasses that signify special limitations such as (e) erosion, (w) excess wetness, (s) problems in the rooting zone, and (c) climatic limitations. Within subclasses are capability units that give some prediction of expected agricultural yields and indicate treatment needs. The capability units are groupings of soils that have common responses to pasture and crop plants under similar systems of farming.

Each soil type in the Project Area was assigned its appropriate LCC using the Marin County Soil Survey (SCS 1985). LESA generalizes these LCCs into a numerical point value (0-100) that is called a soil LCC point rating (Table 1, below).

Table 1: Numeric Conversion of Land Capability Classification Units

LCC from Marin Soil Survey	LESA LCC Point Rating
I	100
IIe	90
IIs,w	80
IIIe	70
IIIs,w	60
IVe	50

LCC from Marin Soil Survey	LESA LCC Point Rating
IVs,w	40
V	30
VI	20
VII	10
VIII	0

Under the LESA analysis, the LCC designation (e.g., IV -e) for each mapping unit in the Project Area is identified, and these designations are entered into the worksheet. The Numeric Conversion of Land Capability Classification in Table 1 are then used to obtain a numeric score for each mapping unit, and these scores are entered into the worksheet. The proportion of each soil mapping unit within the Project Area is multiplied by the LCC points for each mapping unit, and these scores are entered into the worksheet.

For this project, the proportion of each soil mapping units in the Project Area was calculated by using digital coverage from Natural Resources Conservation Service (formerly - Soil Conservation Service), United States Department of Agriculture for the Marin County Soil Survey using ArcGIS 9.1. Soils data was "clipped" to the Project Area boundary and acreages were then calculated for each soil type. Then the acreages for each soil type were divided by the entire Project Area acreage to get the proportion of each soil type. These were multiplied by the conversion factors in Table 1. All of the individual LCC scores were then summed to obtain a single LCC Score for the two possible agricultural outcomes that could result from proposed project.

Factor 2) Storie Index - The Storie Index provides a numeric rating (based upon a 100 point scale) of the relative degree of suitability or value of a given soil for intensive agriculture. The rating is based on soil characteristics only and is obtained by evaluating such factors as soil depth, surface layer texture, subsoil characteristics, drainage, salts and alkali, and relief. Four general factors are considered in the index rating. These factors are A-the characteristics of the soil profile and soil depth; B-the texture of the surface layer; C-the dominant slope of the soil area; and X-other factors more readily subject to management or modification.

Soils are placed in one of six grades according to their suitability for general intensive agriculture as shown by their Storie index ratings. Soils of grade 1 are excellent or well suited to general intensive agriculture. Soils of grade 2 are good and are also well suited to agriculture, although they are not so desirable as soils of grade 1. Soils of grade 3 are only fairly well suited; soils of grade 4 are poorly suited; and soils of grade 5 are very poorly suited. Grade 6 consists of soils and miscellaneous areas that are not suited to agriculture.

As part of the LESA analysis, the Storie Index Rating for each mapping unit is determined and entered into the worksheet. The proportion of each soil mapping unit found within the Project Area is multiplied by the Storie Index Rating. The individual Storie Index Rating scores are then summed to generate a single Storie Index Rating.

As discussed under LCC, for this project, the proportion of each soil mapping units in the Project Area was calculated by using digital coverage from Natural Resources Conservation Service (formerly - Soil Conservation Service), United States Department of Agriculture for the Marin County Soil Survey using

ArcGIS 9.1. Analysis of Factor 2 involved getting a list of the Storie Indexes for soil types in Marin County from United States Department of Agriculture Petaluma, CA office. The Storie Index Rating scores were then summed to obtain a single Storie Index Rating score for the two possible agricultural outcomes that could result from proposed project.

Site Assessment Factors

Factor 3) Project Size Rating - The inclusion of the measure of a project's size in the California Agricultural LESA Models is a recognition of the role that farm size plays in the viability of commercial agricultural operations (California Department of Conservation 1997). In general, larger farming operations can provide greater flexibility in farm management and marketing decisions (California Department of Conservation 1997). Certain economies of scale for equipment and infrastructure can also be more favorable for larger operations (California Department of Conservation 1997). In addition, larger operations tend to have greater impacts upon the local economy through direct employment, as well as impacts upon support industries (e.g., fertilizers, farm equipment, and shipping) and food processing industries (California Department of Conservation 1997).

The Project Size Rating (PSR) relies upon acreage figures that were tabulated for the first two factors using ArcGIS 9.1. The PSR is based upon identifying acreage figures for three potential separate groupings of soil classes within the Project Area and then determining which grouping generates the highest Project Size Score. Each of the three categories is given a project size score based on the number of acres (Table 2).

Table 2. LCC Soil Class PSR Scoring

LCC Class I or II soils		LCC Class III soils		LCC Class IV or lower	
Acres	*Score*	*Acres*	*Score*	*Acres*	*Score*
80 or above	100	160 or above	100	320 or above	100
60-79	90	120-159	90	240-319	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
fewer than 10	0	20-39	30	fewer than 40	0
		10-19	10		
		fewer than 10	0		

Factor 4) Water Resources Availability Rating - The Water Resources Availability Rating is based upon identifying the various water sources that may supply a given property and then determining whether different restrictions in supply are likely to take place in years that are characterized as being periods of drought and non-drought. For each water resource supply portion of the project site, the feasibility for irrigated and dryland agriculture is evaluated, as well as whether any physical or economic restrictions exist during both drought and non-drought years. A physical restriction is an occasional or regular interruption or reduction in a water supply, or a shortened irrigation season, that forces a change in agricultural practices -- such as planting a crop that uses less water, or leaving land fallow. This could be from cutbacks in supply by irrigation and water districts or by ground or surface water becoming depleted or unusable. An economic restriction is a rise in the cost of water to a level that forces a reduction in consumption. Irrigated agricultural production is feasible when: 1) There is an existing irrigation system on the project site that can serve the portion of the project; 2) Physical and/or economic restrictions are not severe enough to halt production; and 3) It is possible to achieve a viable economic return on crops though irrigated production. Table 3 includes 14 scenarios for developing the Water Resource Score.

The Seashore staff digitized the areas of known irrigation activity on the Giacomini Ranch. This area was then divided by the total Project Area to get a proportion. The Giacominis perform seasonal irrigation under an appropriative water right issued to them with water piped to the ranch through a contract with North Marin Water District that ends in July 2008. The Giacominis used to install a seasonal gravel dam and pump water directly out of Lagunitas Creek, but the State Water Resources Control Board required the Giacomini family to cease installing the gravel dam at that location after 1997 due to concerns about effect on salmonids and other threatened and endangered species.

Table 3. Water Resources Score Table, including drought and non-drought conditions

Option	Non-Drought Years			Drought Years			WATER RESOURCE SCORE
	RESTRICTIONS			RESTRICTIONS			
	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	-- --	-- --	50
9	YES	NO	YES	NO	-- --	-- --	45
10	YES	YES	NO	NO	-- --	-- --	35
11	YES	YES	YES	NO	-- --	-- --	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought and non-drought years						25
13	Irrigated production not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years)						20
14	Neither irrigated nor dryland production feasible						0

Factor 5) Surrounding Agricultural Land Rating /
Factor 6) The Surrounding Protected Resource Land Rating –
Determination of the surrounding land use rating is based upon the identification of a project's "Zone of Influence" (ZOI), which is defined as that land near a given project, both directly adjoining and within a defined distance away, that is likely to influence, and be influenced by, the agricultural land use of the subject project site.

The zone of influence is found by first drawing the smallest possible rectangle that completely contains the project area. Then a second rectangle is drawn 0.25 mile beyond the first rectangle on all sides. The county parcel layer was used and all parcels that fell within or were intersected by the larger rectangle (minus the actual project area) were analyzed. Parcels within or partially within the survey rectangles are considered the ZOI.

All parcels that are in current agricultural use are grouped together and given a total acreage. Agricultural use can be determined using information from the Department of Conservation's Important Farmland Map Series, the Department of Water Resources' Land Use Map Series, locally derived maps, or direct site inspection. For agricultural land that is currently fallowed, a determination must be made concerning whether the land has been fallowed as part of a rotational sequence during normal agricultural operations, or because the land has become formally "committed" to a nonagricultural use.

Land that has become formally committed, whether fallow or not, should generally not be included in determining the proportion of the Zone of Influence that is agricultural land. The percentage of lands that are in agricultural use is divided by the total ZOI acreage and multiplied by 100 to get a percentage used for the Surrounding Agricultural Land Rating (Factor 5). Within this Project Area, the percentage of lands within the ZOI that are currently used for agriculture was based on whether the land was used strictly for residential or commercial usage or whether there were ongoing agricultural operations. The percentage is then assigned a Surrounding Agricultural Land Score using the numerical conversion in Table 4.

Protected resource lands are those lands with long term use restrictions that are compatible with or supportive of agricultural uses of land. Included among them are the following:

- Williamson Act contracted lands
- Publicly owned lands maintained as park, forest, or watershed resources
- Lands with agricultural, wildlife habitat, open space, or other natural resource easements that restrict the conversion of such land to urban or industrial uses.

All parcels designated for Protected Resource Land are grouped together and given a total acreage. The Protected Resource Land area is divided by the total ZOI acreage and multiplied by 100 to get a percentage for the Surrounding Protected Resource Land Rating. The surrounding protected resource land score is determined based on evaluation against Table 4. Within this Project Area, Protected Resource lands were determined by calculating which lands were in private ownership versus ownership by a resource agency (e.g., National Park Service, Wildlife Conservation Board, Marin County Department of Parks and Open Space) and, for those lands that are in private ownership, properties that are under Williamson Act or have a conservation easement through Marin Agricultural Land Trust (MALT) were also treated as Protected Resource Lands. The acreage of these areas was determined using ArcGIS 9.1.

Table 4. ZOI Surrounding Land Scoring Tables

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<19	0

Percent of ZOI Protected	Protected Resource Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<20	0

Results

The results of the LESA analysis for the Giacomini Wetland Restoration Project are summarized for each of the six factors below.

Land Evaluation Factors

Factor 1) USDA Land Capability Classification (LCC) - The soil types and corresponding LCCs for soils in the Project Area are shown in Figure C-2. Under the No Action alternative in which only 11 acres would be converted from agriculture to wetland and leased grazing would be allowed on the remainder of the property, the LCC score would be 0.00 (Table 6). Under the No Action Alternative and all of the Action Alternatives where there would be no leased grazing, the final LCC score would be 17.21 (Table 5).

Factor 2) Storie Index -

Under the No Action alternative in which only 11 acres would be converted from agriculture to wetland and leased grazing would be allowed on the remainder of the property, the Storie Index score would be 1.70 (Table 6). Under the No Action Alternative and all of the Action Alternatives where there would be no leased grazing, the final LCC score would be 17.05 (Table 5).

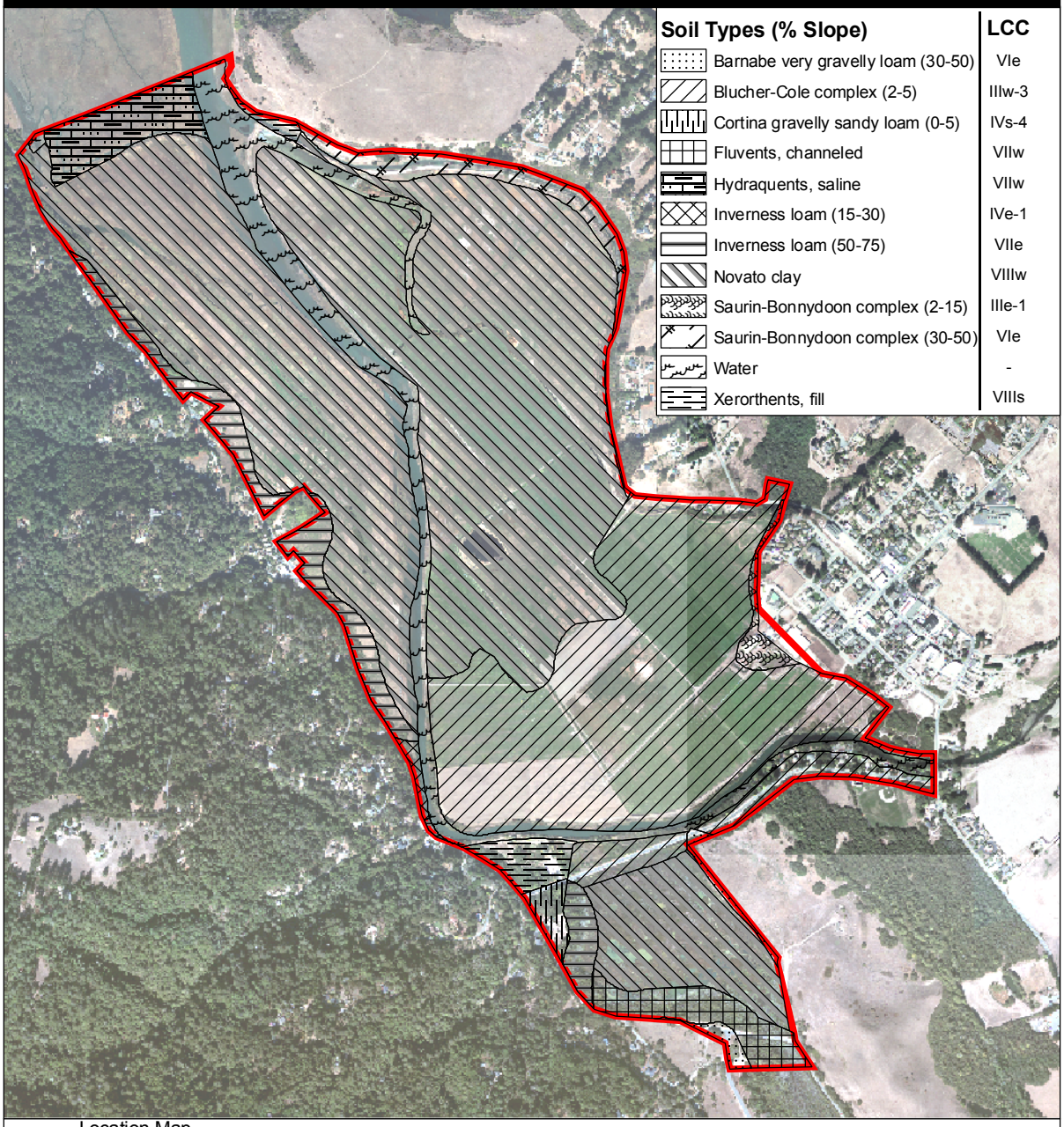
Table 5. Giacomini Project – No Action without Grazing and Action Alternative Land Evaluation Factors Score Results

Land Evaluation Worksheet
Land Capability Classification (LCC) and Storie Index Scores
Action Alternatives

Soil Map Unit	Soil Name	Project Acres	Proportion of Project (653.37 acres)	LCC	LCC Rating	LCC Score	Storie Index	Storie Index Score
103	Barnabe very gravelly loam	3.27	0.01	VIe	20	0.10	13	0.07
105	Blucher-Cole complex	165.13	0.25	IIIw-3	60	15.16	54	13.65
114	Cortina gravelly sandy loam	3.43	0.01	IVs-4	40	0.21	70	0.37
127	Fluvents, channeled	13.07	0.02	VIIw	10	0.20	0	0.00
131	Hydraquents, saline	14.46	0.02	VIIw	10	0.22	9	0.20
133	Inverness loam	1.54	0.00	IVe-1	50	0.12	70	0.16
135	Inverness loam	24.42	0.04	VIIe	10	0.37	21	0.78
147	Novato clay	356.36	0.55	VIIIw	0	0.00	2	1.09
161	Saurin-Bonnydoon complex	4.08	0.01	IIIe-1	70	0.44	48	0.30
163	Saurin-Bonnydoon complex	12.68	0.02	VIe	20	0.39	22	0.43
203	Xerorthents, fill	8.17	0.01	VIIIs	0	0.00	0	0.00
250	Water	46.76	0.07	-	0	0	0	0.00
Totals		653.37	1.00		**LCC Total**	**17.21**	**Storie Total**	**17.05**

LESA Land Capability Classification (LCC)

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

0 0.25 0.5 0.75 1 Miles

Source: Soil and LCC data provided by the the USDA.

Appendix C
Figure 2

Table 6. Giacomini Project – No Action Alternative with Grazing Land Evaluation Factors Score Results

Land Evaluation Worksheet
Land Capability Classification (LCC) and Storie Index Scores
No-Action Alternative

Soil Map Unit	Soil Name	Project Acres	Proportion of Project (12.89 acres)	LCC	LCC Rating	LCC Score	Storie Index	Storie Index Score
147	Novato clay	10.97	0.85	VIIIw	0	0.00	2	1.70
250	Water	1.92	0.15	-	0	0	0	0.00
Totals		12.89	0.02		**LCC Total**	**0.00**	**Storie Total**	**1.70**

Site Assessment Factors

Factor 3) Project Size Rating – As discussed under methods, the Project Size Rating is calculated using grouping of LCCs ranging from I to VIII into three categories: I-II, III, and IV-VIII. The acreages are totaled for each of the three categories. The highest of the three scores is then used for the overall Project Size Score. Analysis of the Action Alternatives showed that within the Project Area, the area for Class I-II soils was 0 acres, the area for Class III soils was 169.21 acres, and the area for the Class IV or lower soils was 484.16 acres. The PSR for both the Class III and Class IV or lower scores was 100, resulting in an overall Project Size Score of 100 for the No Action Alternative without leased grazing and all Action Alternatives (Table 7).

Table 7. Project Size Score for Giacomini Project Action Alternative.

Site Assessment Worksheet
Project Size Score
Action Alternative

Soil Map Unit	Soil Name	LCC Class I-II	LCC Class III	LCC Class IV-VIII	
103	Barnabe very gravelly loam			3.27	
105	Blucher-Cole complex		165.13		
114	Cortina gravelly sandy loam			3.43	
127	Fluvents, channeled			13.07	**Highest Project Size Score**
131	Hydraquents, saline			14.46	**100**
133	Inverness loam			1.54	
135	Inverness loam			24.42	
147	Novato clay			356.36	
161	Saurin-Bonnydoon complex		4.08		
163	Saurin-Bonnydoon complex			12.68	
203	Xerorthents, fill			8.17	
250	Water			46.76	
Totals		**0**	**169.21**	**484.16**	
		Project Size Score			
		0	**100**	**100**	

Under the No Action Alternative with leased grazing, the portion of the Project Area that would be eliminated from agricultural activities totals 12.89 acres, which includes the 11-acre mitigation area. This outcome would result in a Project Size Score of 0.00 (Table 8).

Table 8. Project Size Score for Giacomini Project – No Action Alternative.

Site Assessment Worksheet
Project Size Score
No Action Alternative

Soil Map Unit	Soil Name	LCC Class I-II	LCC Class III	LCC Class IV-VIII	
147	Novato clay			10.97	**Highest Project Size Score**
250	Water			1.92	**0**
Totals		**0**	**0**	**12.89**	
		Project Size Score			
		0	**0**	**0**	

Factor 4) Water Resources Availability Rating **-** As discussed under Methods, the Giacominis perform seasonal irrigation under an appropriative water right issued to them with water piped to the ranch through a contract with North Marin Water District that ends in July 2008. The Giacominis have used these irrigation waters to flood- or spray irrigate a large portion of the East Pasture, but they have not irrigated the West Pasture. The Giacominis used to install a seasonal gravel dam and pump water directly out of Lagunitas Creek, but the State Water Resources Control Board required the Giacomini family to cease installing the gravel dam at that location after 1997 due to concerns about effect on salmonids and other threatened and endangered species. The potential for provision of -- and viability of obtaining --irrigation waters from NMWD in the future is both physically and economically uncertain. Under its purchase agreement with the Giacomini family, the Park Service would assume full ownership of 2 cfs of the appropriative water right. The Park Service does not plan to continue irrigation once it assumes full management of the Giacomini Ranch, but rather plans to designate this right for beneficial in-stream uses.

The irrigated and not-irrigated areas were then given a numerical score according to Table 3. These scores were then multiplied by their proportion to get a water availability score for each area (irrigated and not-irrigated). These scores were then added together for a total water availability score of 39.5 for the (Table 9). This score is applicable to the outcome under which there is no leased grazing under the Action Alternatives and the no Action Alternative.

Table 9. Water Resources Availability Score Giacomini Project Action Alternative.

Site Assessment Worksheet
Water Resources Availability
Action Alternative

Project Portion	Water Source	Proportion of Project Area (655.60 acres)	Water Availability Score	Weighted Availability Score (C x D)
1	Irrigated (Water Right)	26%	95	24.7
2	Not Irrigated	74%	20	14.8
		100%	**Water Total**	**39.5**

Under the No Action Alternative, the area of restoration is not irrigated, so the scores are adjusted accordingly (20; Table 10).

Table 10. Water Resources Availability Score Giacomini Project – No Action Alternative.

Site Assessment Worksheet
Water Resources Availability
No Action Alternative

Project Portion	Water Source	Proportion of Project Area (655.60 acres)	Water Availability Score	Weighted Availability Score (C x D)
1	Irrigation District	0	95	0
2	Not Irrigated	100%	20	20
		100%	**Water Total**	**20**

Factor 5) Surrounding Agricultural Land Rating /
Factor 6) The Surrounding Protected Resource Land Rating –
Figure C-3 shows the ZOI with the surrounding agricultural land and protected resource land categories in the Project Area highlighted. Because of the smaller size of the proposed project under the No Action Alternative and the manner in which the corresponding ZOI boundaries were aligned (Figure C-4), the No Action Alternative with leased grazing would have a larger Surrounding Agricultural Land Score (80) and a smaller Surrounding Protected Resource Land Score (30; Table 11) than the other outcome. The Action Alternatives and the No Action Alternative without leased grazing would have a lower Surrounding Agricultural Land Score (10) and a higher Surrounding Protected Resource Land Score (60; Table 11) than the other agricultural outcome (Figure C-3). Again, the difference in numbers relative to each outcome relates primarily to how the ZOI boundaries are drawn relative to the different boundaries of the proposed project under each outcome or the amount of land that would be converted under each outcome from agricultural uses (Figures C-3 and C-4).

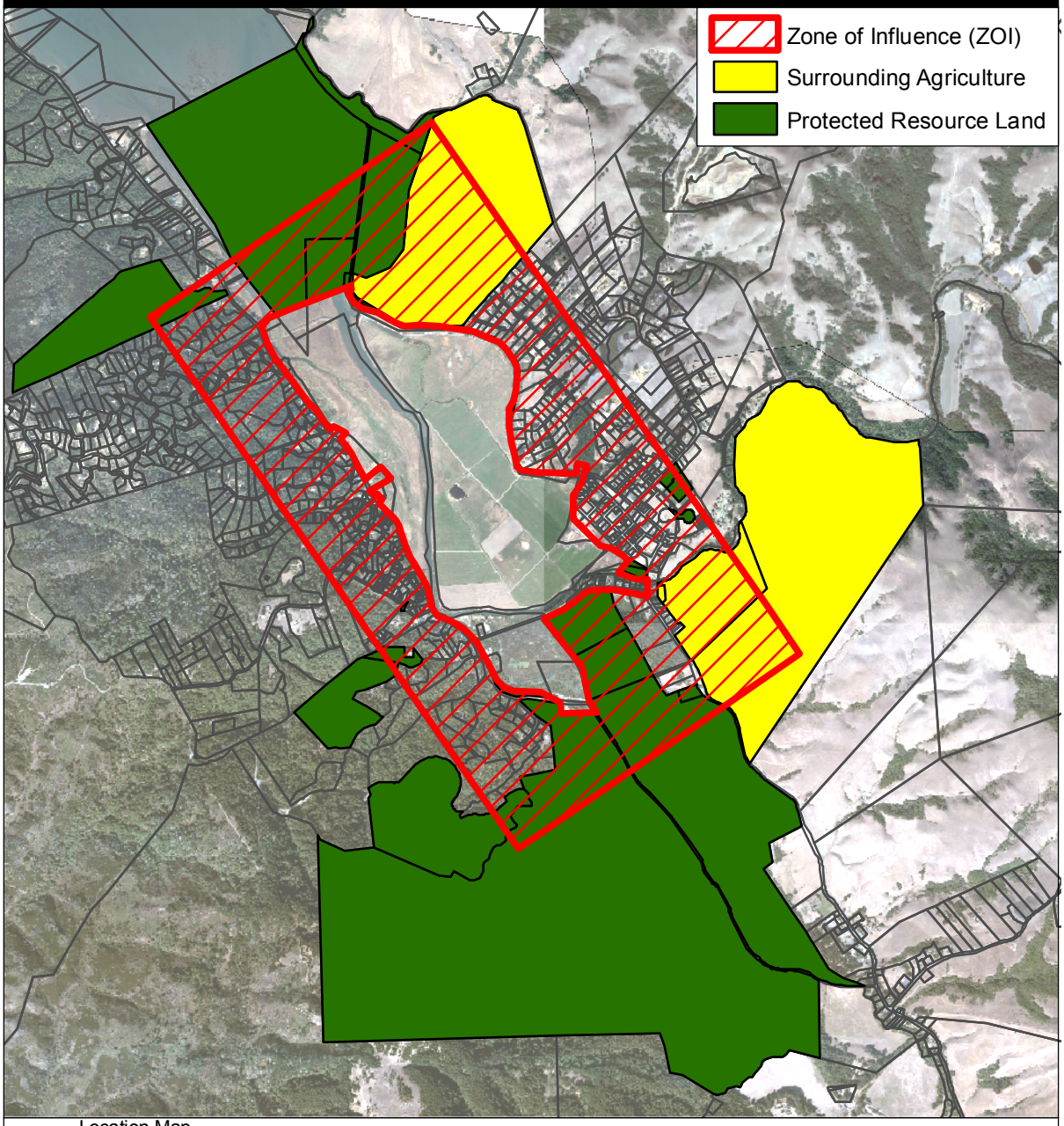
Table 11. Surrounding Agricultural Land and Protected Land Resource Factor Scores for Action and No Action Alternatives for the Giacomini Wetland Restoration Project

Site Assessment Worksheet 3
Surrounding Agricultural Land and Surrounding Protected Resource Land

	Zone of Influence						
	ZOI Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture	Percent Protected Resource Land	**Surrounding Agricultural Land Score**	**Surrounding Protected Resource Land Score**
Action Alternative and No Action without leased grazing (Figure C-3)	3753	758	2041	20.20%	54.38%	**10**	**60**
No Action Alternative with leased grazing (Figure C-4)	1206	730	429	60.53%	35.57%	**80**	**30**

LESA Surrounding Land Use - Action Alternatives

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

0 0.5 1 1.5 2 Miles

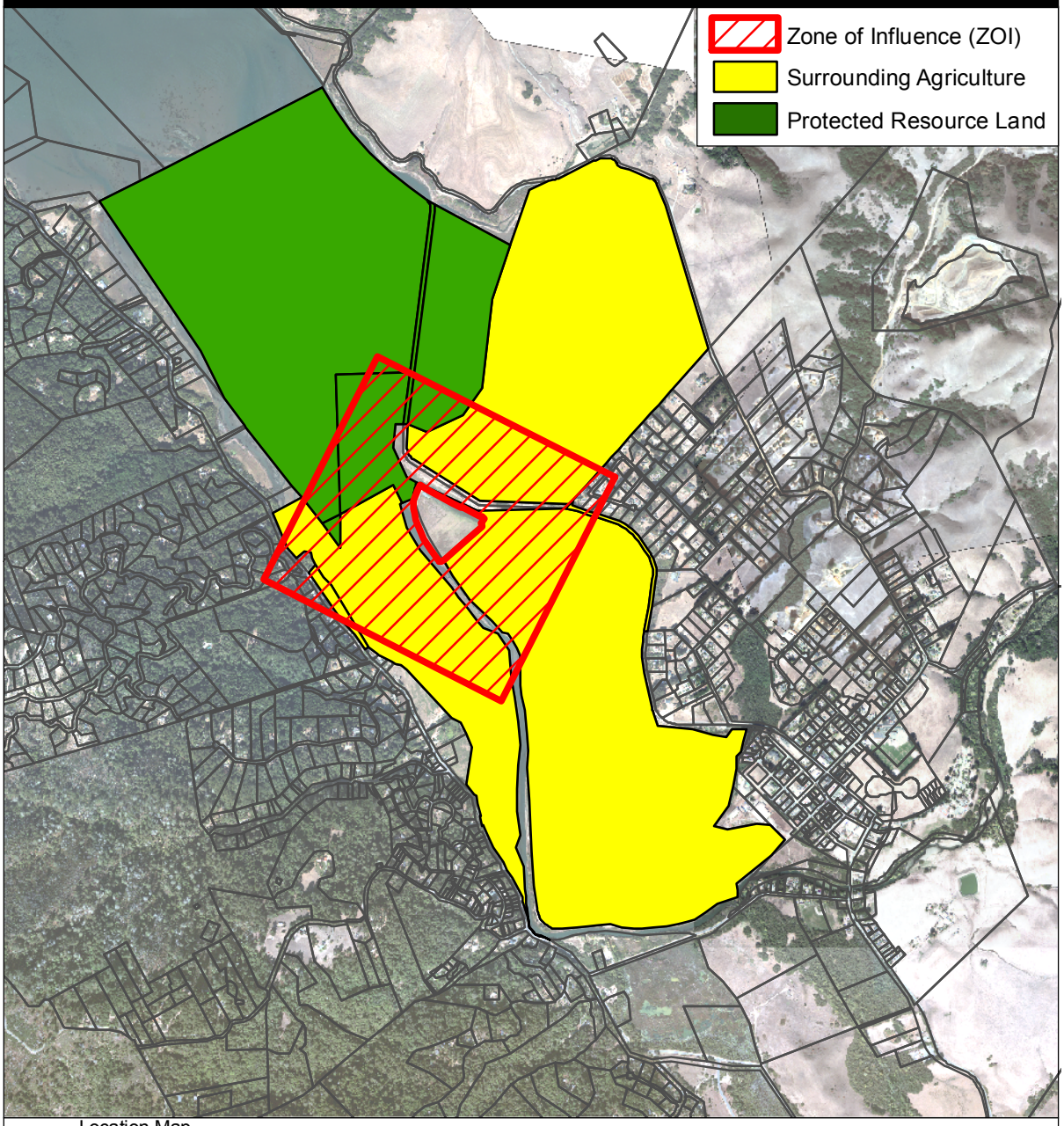
Source: Land use data provided by the County of Marin GIS department

Appendix C
Figure 3

Plot Date: November 8, 2005 S:/GIS/projects1/Giacomini/EIS/landuse.mxd

LESA Surrounding Land Use - No Action Alternative

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

0 0.25 0.5 0.75 1 Miles

Source: Land use data provided by the County of Marin GIS department

Appendix C
Figure 4

Plot Date: November 8, 2005 S:/GIS/projects1/Giacomini/EIS/landuse.mxd

Final LESA Scoring

Background: The California LESA Model is weighted so that 50 percent of the total LESA score of a given project is derived from the Land Evaluation factors and 50 percent from the Site Assessment factors. The below table, "Final LESA Score Sheet", shows the individual factor scores with their respective weights, which are multiplied. The weighted scores are then totaled for a final LESA.

The California Agricultural LESA Model is designed to make determinations of the potential significance of a project's conversion of agricultural lands during the Initial Study phase of the CEQA review process (Table 12). Scoring thresholds are based upon the total LESA score as well as the component LE and SA subscores. In this manner, the scoring thresholds are dependent upon the attainment of a minimum score for the LE and SA subscores so that a single threshold is not the result of heavily skewed subscores (i.e., a site with a very high LE score, but a very low SA score, or vice versa).

Table 12. LESA Scoring Table for CEQA Impact Determination

Total LESA Score	Scoring Decision
0 to 39 Points	Not Considered Significant
40 to 59 Points	Considered Significant only if LE and SA subscores are each greater than or equal to 20 points
60 to 79 Points	Considered Significant unless either LE or SA subscore is less than 20 points
80 to 100 Points	Considered Significant

Under Park Service NEPA guidance, parks are expected to evaluate the intensity of impacts under a broader context that rates impacts as "No Effect," "Negligible," "Minor," "Moderate," and "Major." To allow for this broader evaluation of impacts, the cut-off scores for impacts that would be considered significant under CEQA were equated with major impacts under NEPA, and the range of possible scores below this cut-off score was equally divided, where possible, to obtain numerical thresholds for Negligible to Moderate impacts (Table 13).

Table 13. LESA Scoring Table for NEPA Impact Determination for Giacomini Wetland Restoration Project

No Impact/ Not Applicable	There would be no potential for an impact to agricultural resources.
Negligible	There would be a barely detectable effect on agricultural resources such that the LESA score would total ≤20 points.
Minor	There would be a measurable effect on agricultural resources such that: 1) the LESA score would total between 20 and 49 points; ***OR*** 2) the LESA score would be between 20 and 39 points if the Land Evaluation **OR** Site Analysis subscores ≥ 20 points.

Table 13. LESA Scoring Table for NEPA Impact Determination for Giacomini Wetland Restoration Project

Moderate	There would be an appreciable effect on agricultural resources such that: 1) the LESA score would total between 50 and 79 points; ***OR*** 2) the LESA score would be between 40 and 59 points if the Land Evaluation **OR** Site Analysis subscores ≥ 20 points.
Major or Substantial	There would be a substantial or major effect on agricultural resources such that: 1) the LESA score would total between 80 and 100 points; ***OR*** 2) the LESA score would be between 60 and 79 if the Land Evaluation **OR** Site Analysis subscores ≥ 20 points; ***OR*** 3) the LESA score would be between 40 to 59 points if the Land Evaluation **AND** Site Analysis subscores ≥ 20 points.

Results: The Action Alternatives associated with the Giacomini Wetland Restoration Project and the No Action Alternative without leased grazing received a score of 33.99 (Table 14). This score results in a determination that Alternatives A-D and the No Action without leased grazing would have the potential for a minor effect (Table 13) under NEPA and a less than significant effect under CEQA (Table 12). The Site Assessment subanalysis totaled more than 20 points (25.43), although the Land Evaluation subanalysis totaled considerably less than 20 points (8.56), so the total LESA score needed to fall between 20 and 39 points (33.99; Table 14). Therefore, Action Alternatives and the No Action Alternative without leased grazing would not result in substantial or major impacts to agricultural conditions in the area and is therefore not considered significant under CEQA (Table 14).

Table 14. Final LESA Score for Action Alternatives under Giacomini Project

Final LESA Score Sheet
Action Alternatives

	Factor Scores	Factor Weight	Weighted Factor Scores
Land Evaluation Factors			
Land Capability Classification	17.21	0.25	4.30
Storie Index	17.05	0.25	4.26
LE Subtotal		0.50	8.56
Site Assessment Factors			
Project Size	100.00	0.15	15.00
Water Resource Availability	39.50	0.15	5.93
Surrounding Agricultural Land	10.00	0.15	1.50
Surrounding Protected Resource Land	60.00	0.05	3.00
SA Subtotal		0.50	25.43
	Final LESA Score		**33.99**

The No Action Alternative with leased grazing associated with the Giacomini Wetland Restoration Project would result in conversion from agricultural use for approximately 12 acres of the Project Area, with the remaining area potentially supporting limited grazing activities. The LESA score of 16.93 would result in only a negligible effect under NEPA and a less than significant effect under CEQA, therefore, the No Action Alternative with leased grazing would not result in major or substantial impacts

to agricultural conditions in the area and is, therefore, not considered significant under CEQA (Table 15).

Table 15. Final LESA Score for the No Action Alternative under Giacomini Project

Final LESA Score Sheet
No Action Alternatives

	Factor Scores	Factor Weight	Weighted Factor Scores
Land Evaluation Factors			
Land Capability Classification	0.00	0.25	0.00
Storie Index	1.70	0.25	0.43
LE Subtotal		0.50	0.43
Site Assessment Factors			
Project Size	0.00	0.15	0.00
Water Resource Availability	20.00	0.15	3.00
Surrounding Agricultural Land	80.00	0.15	12.00
Surrounding Protected Resource Land	30.00	0.05	1.50
SA Subtotal		0.50	16.50
	Final LESA Score		**16.93**

References

California Department of Conservation (1997). California Agricultural Land Assessment and Site Assessment Model. Instruction Manual Sacramento, Calif.

U.S. Soil Conservation Service (1985). Soil Survey of Marin County, California, U.S. Department of Agriculture. Prepared in cooperation with the National Park Service and University of California Agricultural Experiment Station: 229.

Appendix D

Statement of Findings for Wetlands and Floodplains

Giacomini Wetland Restoration Project EIS/EIR
Point Reyes National Seashore/Golden Gate National Recreation Area
California State Lands Commission

Statement of Findings For Wetlands and Floodplains

Marin County, California

Recommended:_____
Superintendent, Point Reyes National Seashore Date

Recommended:_____
Chief, Water Resources Division Date

Recommended:_____
Regional Safety Officer Date

Recommended:_____
Pacific West Regional Director Date

Preliminary

Statement of Findings For Wetlands and Floodplains

Giacomini Wetland Restoration Project

Marin County, California

Golden Gate National Recreation Area
Point Reyes National Seashore
California State Lands Commission

April 25, 2007

Introduction

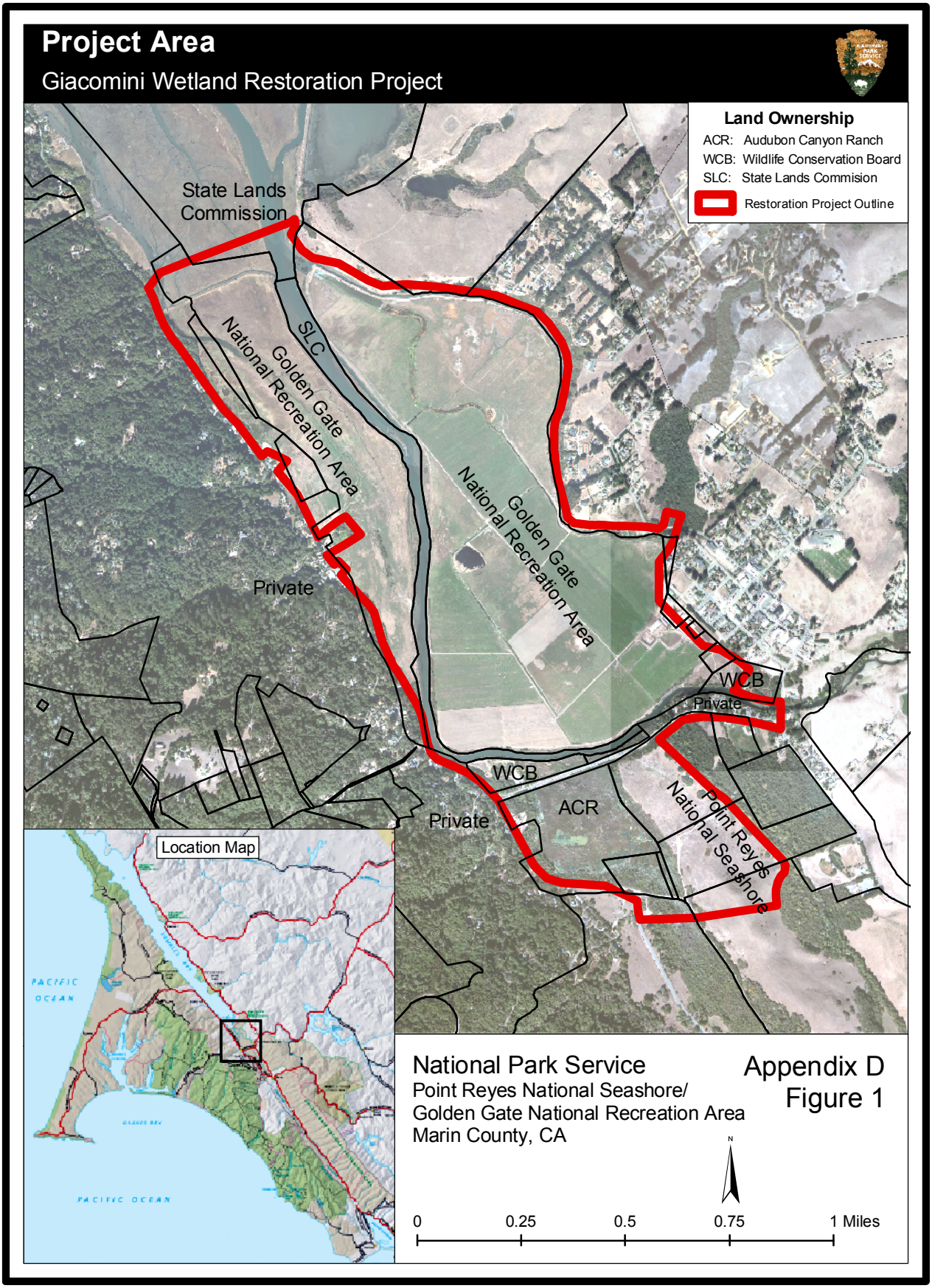
Since early 1900s, levees constructed at the southern end of Tomales Bay for roads and dairy farms have served to hydrologically disconnect Lagunitas Creek and its tributaries from their floodplains. Infrastructure such as levees, tidegates, and culverts, as well as intensive agricultural management, degraded the condition of wetlands in the Waldo Giacomini Ranch (Giacomini Ranch) and Olema Marsh and substantially reduced hydrologic and ecological functionality of what was once of the largest integrated tidal marsh complexes in Tomales Bay. Hydrologically connected, natural wetlands provide many important functions and services for humans and wildlife, including floodwater retention, water quality improvement, wildlife habitat and food supply, recreational opportunities, and support of mariculture and fisheries industries. Because two-thirds of Tomales Bay's freshwater inflow passes through the Project Area, these wetlands may have once played an integral role in maintaining health of Tomales Bay, which has deteriorated over the last century because of excessive sedimentation, water and sediment quality problems, non-native species invasions, and other issues.

In 2000, the Park Service acquired the Giacomini Ranch for the purpose of wetland restoration using a combination of Congressional appropriations and mitigation monies from the California Department of Transportation (CalTrans). The Giacomini Ranch is located in the county of Marin in the San Francisco Bay region in California (Figure D-1). The Giacomini Ranch was incorporated into the northern district of the Golden Gate National Recreation Area (GGNRA), which is managed by Point Reyes National Seashore (Seashore). The Seashore also owns a small portion of the Olema Marsh. With this project, the Park Service and its state partner, the California State Lands Commission (CSLC), propose to restore natural hydrologic processes to a significant portion of the Giacomini Ranch and Olema Marsh, thereby promoting restoration of ecological processes and functions. The CSLC owns most of Lagunitas Creek within the Project Area.

The *Draft Environmental Impact Statement/Environmental Impact Report* (DEIS/EIR) evaluates four alternatives for restoring wetlands and wetland functionality and incorporating public access, as well as a No Action Alternative. Among the impact topics evaluated in the draft document are wetlands and floodplains. Executive Orders (EO) 11988 (Floodplain Management) and 11990 (Protection of Wetlands) require the Park Service and other federal agencies to evaluate the consistency of actions with policies on wetlands and floodplains and the likely impacts of actions on these resources. Park Service Director's Order #77-1: Wetland Protection and Procedural Manual #77-1 provide Park Service policies and procedures for complying with E.O. 11990, and Park Service Special Directive 93-4 (Floodplain Management Guideline) provides Park Service guidelines for compliance with E.O. 11988.

Under these guidelines, proposed new development or other new activities, plans, or programs that have the potential for direct or indirect adverse impacts on wetlands and floodplains must document that every effort has been made to avoid or minimize impacts to these resources. Actions proposed by the Park Service that have the potential to have adverse impacts on wetlands and floodplains will be addressed in an Environmental Assessment (EA) or an EIS. If the preferred alternative in an EA or EIS will result in adverse impacts on wetlands and floodplains, a "Statement of Findings" (SOF) documenting compliance with this Director's Order and its implementation procedures will be completed.

Certain "water-dependent" actions may be excepted from the Statement of Findings requirement. For wetlands, this includes scenic overlooks and foot/bike trails or boardwalks; minor stream crossings using culverts or bridges that completely span the channel and associated wetland habitat; actions designed specifically for the purpose of restoring degraded (or completely lost) natural wetland, stream, riparian, or other aquatic habitats or ecological processes that cause less than 0.25 acres of loss; and maintenance, repair, or renovation of currently serviceable facilities or structures. For floodplains, excepted actions include archaeological structures, sites, or artifacts; picnic facilities, scenic overlooks, foot trails, and small associated daytime parking facilities; and certain emergency actions. This SOF documents compliance with these Park Service wetland protection procedures.


Project Area
Giacomini Wetland Restoration Project
Land Ownership
ACR: Audubon Canyon Ranch
WCB: Wildlife Conservation Board
SLC: State Lands Commision
Restoration Project Outline
State Lands Commission
SLC
Golden Gate National Recreation Area
Golden Gate National Recreation Area
Private
WCB
Private
WCB
ACR
Private
Point Reyes National Seashore
Location Map
PACIFIC OCEAN
PACIFIC OCEAN
National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA
Appendix D
Figure 1
N
0
0.25
0.5
0.75
1 Miles

Proposed Action

Of the five alternatives, Alternative D is the lead agencies' preferred alternative, because it best meets the purpose of restoring wetlands while also providing opportunities for public access that allow visitors and residents to experience and enjoy the restored wetlands. Alternative D would involve several types of restoration, including discontinuation of agricultural management; removal of agricultural and hydrologic control infrastructure; tidal channel creation; partial creek realignment; excavation to lower higher elevation areas to active floodplain and marshplain elevations; creation of alternate freshwater marsh habitat for a federally threatened amphibian species; creation of high-elevation high tide refugia habitat for federally and state-listed bird species; and revegetation of marsh, grassland, and riparian habitats. In addition, this alternative would result in enhancement and construction of several new public access facilities, including spur trails on the southern and eastern perimeters; an ADA-compliant trail at White House Pool County park; and several viewing areas and overlooks along the Giacomini Ranch perimeter.

This alternative would take approximately two to four years to construct, depending on the funding and implementation timeline for the public access component. Construction would require operation of numerous pieces of earthmoving equipment in the Project Area, as well as equipment and material stockpiling, during that period.

Description of Wetlands Within Project Area

Extent of Wetlands

While the project is intended to "restore" wetlands, more than 90 percent of the Project Area is already wetland. Wetlands within the Project Area are subject to oversight by several state and federal agencies, including the U.S. Army Corps of Engineers (Corps), the Park Service, the California Coastal Commission (CCC), the Regional Water Quality Control Board (RWQCB), and California Department of Fish and Game (CDFG). The extent of jurisdiction or oversight of wetlands by the Corps, the Park Service, and CCC can differ slightly among some of these agencies because of slightly different interpretations or definition of wetlands from a regulatory or oversight perspective. Based on the minimum number of parameters (hydrology, soils, and/or vegetation) required, the Corps and Park Service methodologies produce the most similar results and are, therefore, the ones presented below.

Corps Jurisdiction

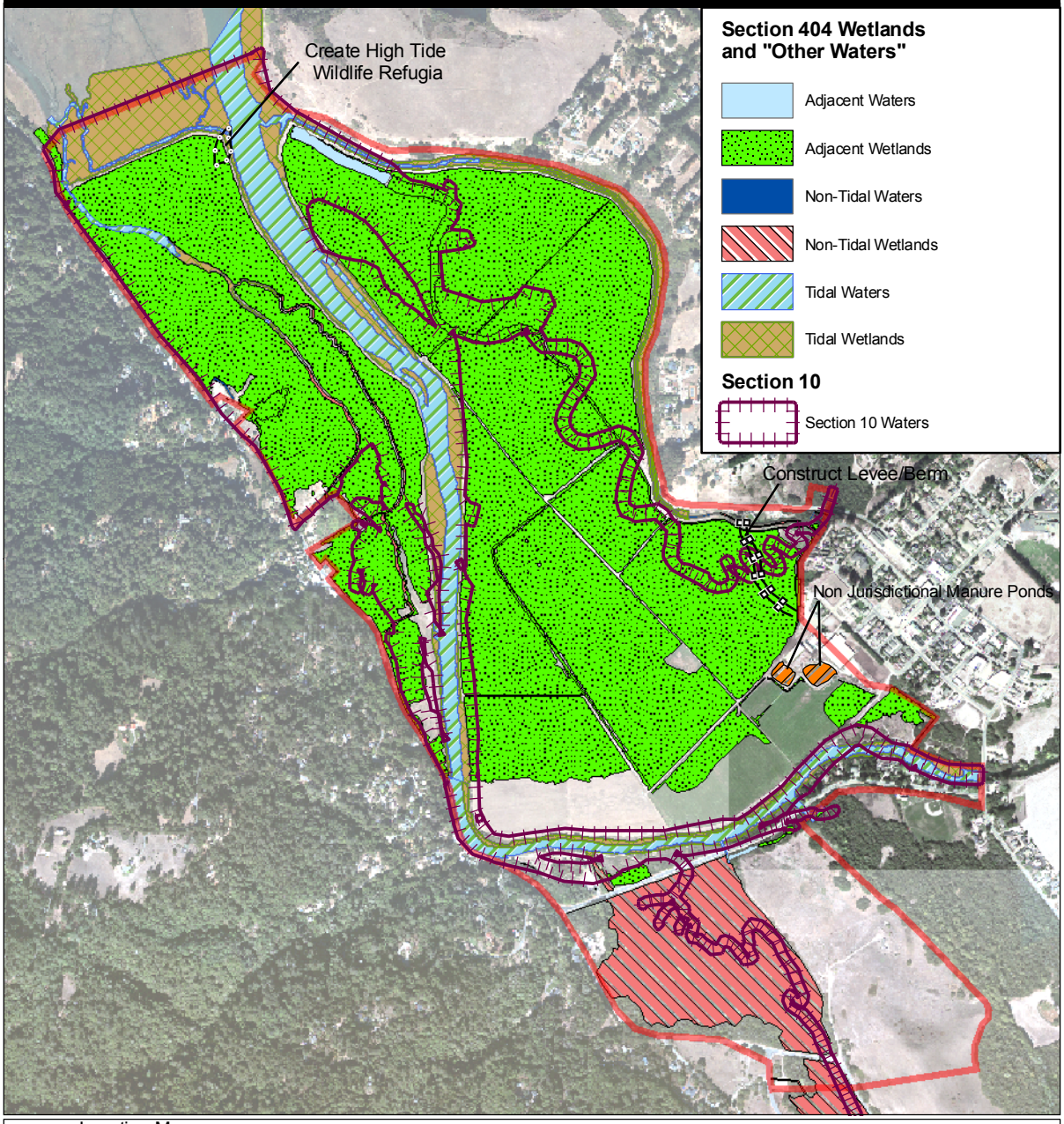
The Corps regulates several types of activities in waters of the United States, which includes navigable waters, tributaries to navigable waters, special aquatic sites (e.g., wetlands), and areas that are "adjacent" to navigable waters. These waters are regulated under Section 404 of the Clean Water Act (40 CFR Section 328.3) or Section 10 of the Rivers and Harbors Act (33 U.S.C. 403). A wetland delineation was performed by the Seashore and verified by the Corps in 2005 (Parsons 2005; Figure D-2). Based on this delineation, 536.6 acres of wetlands and waters subject to Section 404 jurisdiction under the Clean Water Act exist in the Project Area, with 249.3 of those acres also subject to Section 10 jurisdiction under the Rivers and Harbors Act (Parsons 2005).

Park Service Oversight

Director's Order #77-1 established Park Service policies, requirements, and standards for implementing Executive Order 11990, which directs federal agencies to avoid long- and short-term impacts to wetlands. The Park Service uses the Cowardin classification system (Cowardin et al. 1979) as the basis for creating a Park Service standard for defining, classifying, and inventorying wetlands that might be subject to adverse impacts and Park Service oversight.

Corps Jurisdictional Wetlands and Waters

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

0 0.25 0.5 0.75 1 Miles

Appendix D
Figure 2

Park Service lands within the Delineation Study Area generally include the Giacomini Ranch and portions of Bear Valley Creek upstream of Bear Valley Road and the southern 14.0 acres of Olema Marsh. Wetlands potentially subject to management and oversight by the Park Service were delineated using the Cowardin wetland delineation definition developed by the USFWS (Parsons et al. 2005). This definition relies on the presence of two of three criteria – wetland hydrology and hydrophytic vegetation or hydric soils – to classify areas as wetlands. Because of the similarity of this approach to that of the Corps, the Seashore proposed to delineate these wetlands by modifying, if necessary, the boundary line proposed for potential Corps' jurisdiction to incorporate areas that met two, but not necessarily all three, criteria (Parsons et al. 2005).

After reviewing information collected during the delineation, there did not appear to be any areas that would require expansion of the Corps' potential jurisdictional boundary (Parsons et al. 2005). There were some areas that technically only met two of the criteria, but most of these areas qualified as Corps' wetlands, as well, because wetland hydrology and hydrophytic vegetation were present, and the absence of hydric soil indicators could be explained by the fact that soils were fill, recently disturbed, or alluvial and therefore less likely to display obvious hydric soil indicators. Therefore, wetlands potentially subject to management and oversight by the Park Service in the Project Area total 446.4 acres.

Hydrogeomorphic Classification of Wetlands

Within the wetland regulatory and management community, there has been a strong push in recent years to classify wetlands not only according to vegetation type and structure such as freshwater marsh or salt marsh, but on hydrogeomorphology. Naturally, regional variations exist in the specific types of hydrogeomorphic features present, but most wetlands share some basic hydrologic and geomorphic attributes that enable them to be classified, on at least a basic level, by a methodology developed by Brinson (1993). The Project Area incorporates at least five different hydrogeomorphic classes of wetlands, including Estuarine Fringe; Slope Wetlands; Groundwater Slope Wetlands; Riverine Wetlands; and Organic Soil Flats. Because of the hydrologic complexity within the Project Area, a considerable amount of overlap occurs between these geomorphic classes.

Estuarine Fringe Wetlands are comprised of tidal wetlands in the undiked marsh north of the Giacomini Ranch, as well as the narrow fringe of undiked marsh on the outboard of the Giacomini Ranch levees and some of the islands or topographically elevated "central bars" in the middle of Lagunitas Creek. The entire Project Area could be classified as Riverine Wetlands, which include floodplains and riparian areas along rivers, creeks, and streams, although a large portion of the Riverine Wetlands for Lagunitas Creek and Tomasini Creek have been eliminated or minimized through levees that greatly reduce the amount of overbank flooding. Only Fish Hatchery Creek, Bear Valley Creek, and some of the small drainages flowing off the Inverness Ridge are hydrologically connected with their floodplains, although hydrologic functioning of these creeks has also been negatively impacted by culverts, road levees, ditching, and frequent dredging.

With levees reducing the amount of overbank flooding, most of the Giacomini Ranch could be classified as functioning more as Slope Wetlands, with surface runoff and precipitation generally sheetflowing from the higher-elevation southern portions of the two pastures towards the lower-elevation northern portions, where waters drain out either through one-way or modified one-way tidegates or over concrete spillways. Some of the surface run-off derives from groundwater that emerges at the base of the Inverness Ridge or Point Reyes Mesa and flows into the two pastures. This abundant groundwater creates groundwater slope wetlands or, as they have been referred to in other areas of the country, "seepage toeslope" wetlands on the perimeter of both the West and East Pastures. In the West Pasture, the western perimeter is at a higher elevation than most of the rest of the pasture, encouraging sheetflow of this emergent groundwater into the center of the pasture, except where there are depressional basins such as in the extensive freshwater marsh along Sir Francis Drake Boulevard. The Point Reyes Mesa appears to support both seepage toeslope wetlands, as well

as localized areas of hillside seepage slope wetlands, which manifest themselves as extensive arroyo willow forests or Mesic Coastal Scrub on the face of the Point Reyes Mesa bluff. In the East Pasture, the influence of these seeps creates more localized seepage toeslope features, because the perimeter elevation is flatter and more consistent with elevations in the center of the pasture.

Classification of Wetlands

For purposes of compliance with Executive Order 11990, parks are directed to use the "Classification of Wetlands and Deepwater Habitats of the United States" (FWS/OBS-79/31; Cowardin et al. 1979) as the standard for defining, classifying, and inventorying wetlands. The Cowardin classification system is also the basis for the National Wetland Inventory (NWI) maps of wetlands and waters prepared by the USFWS for the entire United States. As part of the CCC delineation, a classification of all wetlands types was conducted. Summarized below are some of the major findings.

***System/Subsytems* (Parsons et al. 2005).** Because of its location at a major freshwater-estuarine confluence, the Project Area is a combination of Palustrine (freshwater) and Estuarine (saltwater) wetlands and Riparian non-wetlands. Estuarine Systems are those in which salinities during the period of average annual low flow exceeds 0.5 ppt (Cowardin et al. 1979). Areas mapped as Estuarine included not only undiked, tidal areas such as Lagunitas Creek and the undiked marsh north of Giacomini Ranch and Lagunitas Creek, but even some areas inside dikes such as the Giacomini Ranch West and East Pastures, Tomasini and Fish Hatchery Creeks, northernmost portions of Olema Creek, and Olema Marsh. Estuarine influence in these areas results either from tidal surface flow muted to some degree either naturally or by improperly functioning tidegates (Olema Marsh; Fish Hatchery Creek/northern portion of Giacomini Ranch West Pasture; Tomasini Creek) or from indirect tidal interaction with the saline groundwater table. The elevated salinities observed in the diked pastures' groundwater tables probably derive from residual marine salts deposited in underlying estuarine sediments when these areas were open to tidal flushing (KHE 2006). Most of the mapped Estuarine areas consisted of the Intertidal Subsystem (2), but the Subtidal Subsystem (1) did occur in Lagunitas Creek, the northern portions of Fish Hatchery and Tomasini Creeks, and some diked portions of old sloughs in the Giacomini Ranch.

Because of the extensive tidal influence at the northern end of the Project Area, Palustrine Systems dominate the southern end, particularly Olema Marsh, Bear Valley Creek, Olema Creek, and the southern end of the Giacomini pastures. In the northern end of the Project Area, Palustrine areas are relegated to the fringes of the Giacomini Ranch on higher gradient sections of creeks such as Tomasini and Fish Hatchery and small drainages and higher elevation areas adjacent to seeps flowing off the Inverness Ridge or Point Reyes Mesa. Often a sharp juxtaposition exists between Palustrine and Estuarine wetlands, as evidenced by the West Pasture freshwater marsh or Palustrine Emergent marsh polygon (e.g., PEM1Eb) adjacent to Sir Francis Drake Boulevard that is bordered by an Estuarine Emergent (E2EM1R) Diked Tidal Salt Marsh polygon with summer groundwater salinities as high as 50 ppt. There are no Palustrine Subsystems.

Some areas on the upland perimeter of the Project Area were mapped as the NWI's new Riparian (Rp) System category. Riparian (Rp) Systems support Scrub Shrub or Forested Class hydrophytic vegetation, but lack wetland hydrology. This category is not wetlands and, therefore is not subject to Corps' jurisdiction or the Park Service's oversight, although areas on state, county, and private lands may fall under jurisdiction by CDFG (Lake and Streambed Alteration Agreement). Acreage of non-wetland Riparian Systems within the Project Area totaled 55.1 acres, with 37.9 of those acres occurring in the Giacomini Ranch (Table 12). Most areas within the Project Area that qualified as Riparian (Rp) are Intermittently (J) or Temporarily Flooded (A) in which flooding occurs only at peak storm flow discharge or for several days following peak discharge or flooding occurs only an episodic basis (i.e., recurrence interval > 2 years). These Riparian Systems are dominated by deeply rooted riparian tree and shrub species -- many of which are considered hydrophytic at least in their seedling and juvenile stages -- that typically rely on groundwater tables that are greater than 12 inches from the soil surface. All of the Riparian System areas were mapped as Lotic (1) or

flowing water Subsystems, because they occurred at the periphery of freshwater streams, creeks, drainages, or actively flowing seeps.

Class/Subclass (Parsons et al. 2005). Most of the Project Area is dominated by low-growing Emergent (EM), Persistent (1) plant species such as pastoral, salt marsh, and ruderal forbs and herbs. Areas with taller vegetation (Scrub Shrub or Forested) tended to occur outside the Giacomini Ranch or on its perimeter due the lack of grazing and/or higher quantities of freshwater from seeps and drainages and creeks. As with Aquatic Bed, the areal extent of the Scrub Shrub class was relatively low within all regions of the Project Area. The Forested Class was the dominant class in the portion of Bear Valley Creek within the Project Area and the second highest class in the White House Pool and Green Bridge County Park and Olema Marsh areas. Unconsolidated Bottom subclasses within the Project Area consisted largely of Cobble-Gravel (1), Sand (2), Mud (3), and Organic (4). Mineral soils (Subclasses 1-3) dominated most of the Project Area, but a combination of Organic and Mud sediments occurred in some of the unvegetated portions of Olema Marsh.

Functionality and Condition of Wetlands

In order to achieve protection of these ecosystems, the Park Service has been directed to "conduct or obtain parkwide wetland inventories to help ensure proper planning with respect to the management and protection of wetland resources" (NPS 2006, Section 4.6.5). Beginning in 2000, the Seashore initiated an enhanced wetlands mapping project. During the first two phases of the project, more than 911 acres within 230 wetlands polygons or areas were inventoried and mapped. In 2003, the Seashore began a third phase of the wetlands mapping project that focused on the 140,094-acre Tomales Bay watershed. As one of the larger landowners within the Tomales Bay watershed, the Park Service felt that it could contribute to improving water quality within Tomales Bay by identifying potential pollutant sources on its lands and targeting degraded wetlands for restoration (Parsons et al. 2004). In order to evaluate the condition of existing wetlands and how well they are currently functioning, the Seashore recognized that it needed to expand its mapping efforts to incorporate a condition and functional assessment of wetlands.

A number of different methodologies exist for assessing wetland condition and/or functions, but, ultimately, the Seashore created a hybrid assessment methodology that incorporated components from several methodologies, including the recently developed California Rapid Assessment Methodology (CRAM; Collins et al. 2003; 2004). This assessment methodology uses indicators or metrics of wetland condition or functionality based on observable impairments or disturbances to hydrologic processes, hydrologic functions, landscape connectivity, soils, vegetation communities, and ecological functions such as wildlife habitat, as well as qualitatively ranking the number and intensity of potential "stressors" to wetlands such as grazing, contamination, etc. (Parsons et al. 2004).

As part of this functional assessment, more than 1,500 acres and 717 polygons of wetlands were mapped within the western portion of Tomales Bay and Olema Valley (Parsons et al. 2004). Using a semi-quantitative evaluation of scores for both functionality and stressors, sites were ranked as being either high or medium priority for more detailed future evaluation of condition and functionality and possible future restoration. A large percentage of the sites or Functional Units that were considered either high or medium priority for restoration occurred in specific areas of the watershed, including the Waldo Giacomini Ranch in the southern portion of Tomales Bay and the Bear Valley Creek subwatershed (Parsons et al. 2004). In fact, of the six high priority restoration "sites" or drainage areas identified in the Tomales Bay-Olema Valley watershed, three of them were on the Giacomini Ranch, specifically the eastern portions of the East Pasture-Tomasini Creek, the leveed portion of Lagunitas Creek, and the diked northern portions of the East and West Pasture (Parsons et al. 2004). Intensive agricultural and/or hydrologic management of Giacomini Ranch and Olema Marsh has degraded conditions within both of these former tidal marshes. In addition, the lack of hydrologic connectivity of the Giacomini Ranch and, to a lesser degree, Olema Marsh, with Lagunitas Creek and other drainages severely reduces the ability of these wetlands to serve functions such as floodwater retention and storage, water quality improvement, carbon export,

and wildlife habitat for marine and estuarine aquatic species that might utilize tidally connected wetlands for foraging, breeding, and refugia.

Description of Floodplains Within Project Area

Extent of Floodplains and Flood Frequency

Situated in an alluvial valley at the confluence of at least three moderate to large-size creeks and a number of smaller drainages, it is perhaps not surprising that the entire Project Area has been mapped within the FEMA-designated 100-year flood hazard zone (Clearwater Hydrology and Nichols-Berman 2002). The extent of the 500-year flood hazard zone was not delineated in the Point Reyes area (Clearwater Hydrology and Nichols-Berman 2002). The history of the Project Area has been one that has marked by a number of catastrophic floods that have caused extensive to homes, ranches, and roads, as well as substantially changed the physical environment. Within the Project Area, flooding is directly influenced by both tidal and watershed processes, with flooding from creeks often exacerbated by extreme tide conditions. However, during normal to high tide conditions, tidal flooding of floodplains within the Project Area has largely been precluded by the presence of levees along Lagunitas Creek and Tomasini Creek and across the mouth of Bear Valley and Olema Creeks.

While major flooding events remain the most memorable in terms of extent of inundation and damage, hydraulic modeling conducted as part of the proposed projects suggests that the Project Area and vicinity floods frequently, even during lesser storm events. Active floodplains – or areas subject to frequent flooding during bankfull or ordinary high water flows that recur every 1.5 years on average – occur principally within the streambeds of creeks such as Lagunitas Creek, Bear Valley Creek, Tomasini Creek, Fish Hatchery Creek, and some of the other smaller drainages that flow into the Project Area. Model simulation results indicate that Giacomini Ranch East Pasture levees start to overtop from higher flows on Lagunitas Creek during 3.5-year flood events, while the West Pasture levees do not overtop until flooding reaches levels consistent with 12-year flood events (KHE 2006). Lagunitas Creek is the principal source of flooding in the Project Area, but not the only one. Bear Valley and Olema Creeks and smaller drainages on the Inverness Ridge often play a large – and, in some cases, an even larger role -- in flooding of Levee Road and Sir Francis Drake Boulevard and properties along these roads.

Impact to Wetlands and Floodplains Within Project Area

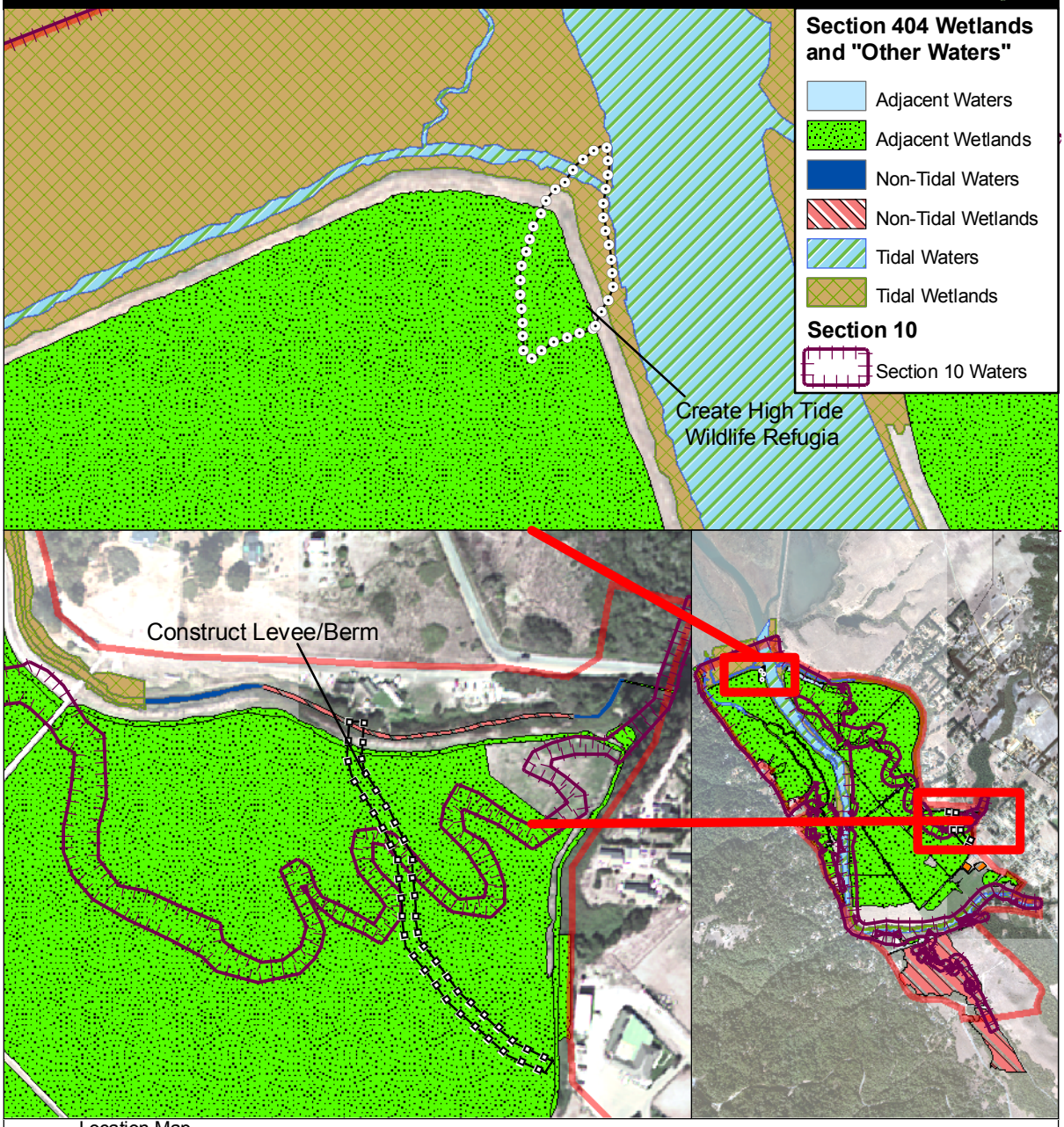
Wetlands

Alternative D would result in approximately 1.82 acres of wetland loss from fill used to create a high tide refugia for special status species in the West Pasture and berms adjacent to the created Tomasini Triangle freshwater marsh and the realigned Tomasini Creek in the East Pasture (Figure D-3). In the West Pasture, a section of the existing levee would be extended slightly northward and widened to provide high tide refugia for the federally and state endangered California clapper rail (*Rallus longirostris obsoletus*) and state threatened California black rail (*Laterallus jamaicensis coturniculus*). A low berm would also be created in the East Pasture to enhance the duration and extent of ponding in the created Tomasini Triangle freshwater marsh for the federally threatened California red-legged frog (*Rana aurora draytonii*), which breeds in freshwater marshes that pond through July or August. Also, it would provide some refugia for wildlife during high tide and floodwater conditions. In addition, because Tomasini Creek is realigned to run through the Tomasini Triangle, low berms would also be placed on either side of the creek to minimize draining of surface waters in the marsh to the creek.

There would also be some potential permanent fill of wetlands and removal of riparian habitat associated with the potential future extension of access facilities on the southern perimeter, including possible construction of a trail to Inverness Park through possible widening of the Sir Francis Drake Boulevard road berm or widening of Levee Road. The level of impact with berm

Potential Impacts to Project Area Wetlands

Giacomini Wetland Restoration Project



Location Map

National Park Service
Point Reyes National Seashore/
Golden Gate National Recreation Area
Marin County, CA

N

Appendix D
Figure 3

widening would vary depending on final design, but impacts would be expected to minor to moderate unless the trail was placed instead on a boardwalk through the West Pasture. As compliance for this component would be conducted through a possible future project conducted jointly with the County, potential impacts to wetlands are not addressed here.

Certain types of actions cannot accomplish their intended purposes unless they are located in or are carried out in close proximity to wetlands (i.e., they are "water dependent"; NPS #77-1 Procedural Manual). Several other types of actions are not water dependent but, in general, are considered to have minimal impacts on wetlands (NPS Wetlands Procedural Manual). These actions may be **excepted** from the Statement of Findings procedures. One of the excepted types of actions are those designed specifically for the purpose of **restoring** degraded (or completely lost) natural wetland, stream, riparian, or other aquatic habitats or ecological processes. For purposes of this exception, "restoration" refers to reestablishing environments in which natural ecological processes can, to the extent practicable, function at the site as they did prior to disturbance. Temporary wetland disturbances that are directly associated with and necessary for implementing the restoration are allowed under this exception (see "conditions" in Section 4.2.A.2).

Actions causing a cumulative **gross** total of up to 0.25 acres of new long-term adverse impacts on natural wetlands may be allowed under this exception if they are directly associated with and necessary for the restoration (e.g., small structures or berms). Because construction of the berms and refugia under Alternative D would impact more than 0.25 acres of wetlands, a Statement of Findings is required for this proposed project if Alternative D was ultimately chosen for implementation. Temporary impacts to wetlands during construction caused by stockpiling of equipment and materials would be an excepted action, because they are necessary for implementing restoration.

Floodplains

Alternative D would include enhancement and construction of spur trails on the southern and eastern perimeter. This alternative also includes construction of an ADA-compliant trail component at White House Pool County park includes construction of a low-elevation viewing platform and replacement of the current portable toilet with an ADA-compliant vault toilet facility and ramp. This viewing platform and vault toilet facility would be within the 100-year floodplain, as would all of the other trail facilities constructed. Viewing platform and vault toilet facility construction would represent, then, less than 1,100 square feet of Class I development within the 100-year floodplain. Trails would be developed and maintained with the assumption that they would be flooded on a regular basis and would be constructed accordingly in terms of construction materials and methods. Therefore, trails are not included within development totals. These facilities would be expected to have no more than negligible adverse impacts on flooding in the Project Area.

While Alternative D does not include construction of a bicycle-pedestrian bridge over Lagunitas Creek as does Alternatives A-C, the Park Service would pursue working with the County of Marin on developing additional public access facilities on the southern perimeter of the Project Area. This would include reevaluation of Levee Road for placement of a pedestrian-bicycle path. Should all other options not prove viable, the Park Service would consider construction of a non-vehicular bridge over Lagunitas Creek through a separate environmental compliance process. As discussed under Alternatives A-C, this bridge would be constructed to accommodate flows equal to or greater than the Green Bridge, which is located directly immediately upstream. Design elevations for the bridge would take into account reductions in vertical flood elevations in Lagunitas Creek with removal of the Lagunitas Creek levees under Alternative C. Based on hydraulic modeling analyses, the portions of Levee Road directly adjacent to White House Pool County Park and Olema Marsh would have reductions in vertical flood elevations ranging as high as 0.6- to 1.1 feet during 10-year flood events (KHE 2006). As a result, under restored conditions, elevation of the bridge would only need to exceed 15 feet NAVD88 to allow for conveyance of 10-year flood flows and 17 feet NAVD88 to allow for conveyance of the 50- and 100-year flood flows at the proposed location (KHE 2006). The bridge would likely be designed to have at least 1- to 2-feet of freeboard. Using this type of

approach, hydraulic modeling results suggest that the bridge would not have more than negligible adverse impacts on flooding in the Project Area.

Justification for Impacts to Wetlands and Floodplains and Potential for Avoidance or Minimization of Impacts

Wetlands

While restoring wetlands would benefit numerous wildlife species, many species require nearby refugia or high-elevation upland areas as refuge during extreme tide or high water conditions. Within the Project Area, some of the species most affected by the presence and extent of high tide refugia are the California black rail and California clapper rail, both of which are marsh species that are relatively poor fliers. Currently, California black rail in the undiked marshlands north of the Giacomini Ranch use the Giacomini Ranch levees as high tide refugia, because many of the natural uplands on the perimeter of Tomales Bay have been developed for homes, roads, businesses, and other uses.

The preferred alternative, Alternative D, would involve complete removal of levees in the West and East Pasture, except for most of the Tomasini Creek levee and a small section of the Lagunitas Creek West Pasture levee. The levee section at the northernmost end of the West Pasture adjacent to the undiked marshlands would be retained as refugia for rails and expanded northward to transition into the natural alluvial levee already present in the undiked marshlands. It would also be widened slightly at the location of the existing levee to increase the amount of high-elevation refuge available. (A small portion of the section that would be retained has already been widened under a separate habitat enhancement project conducted in 2006.)

Further widening of the existing levee and expansion of the levee northward would impact 0.07 acres of existing Corps' jurisdictional wetlands. This impact cannot be minimized for two reasons. First, the refugia needs to be located fairly close to marsh currently used by black rails, because they are relatively poor fliers. Secondly, most of the northern portion of the West Pasture is already wetland, except for the levees and some areas at the toe of the levee. Where possible, the footprint for levee widening would try to minimize the amount of jurisdictional wetlands affected.

As impacts cannot be minimized, the only other option would be avoidance. Under Alternative A, the West Pasture levees are not removed or breached, so there is no proposal to either expand or widen a section of levee. However, retention of the West Pasture levees also limits the ability of Alternative A to fully meet the purpose and objectives of restoring a significant portion of the Project Area.

Under Alternative D, a low berm would also be constructed on the westward perimeter of the created Tomasini Triangle freshwater marsh. This berm would serve several purposes. It would increase the extent and duration of ponding within the created marsh, which is crucial to breeding success for California red-legged frogs. The created marsh would receive inflows primarily from surface water run-off, groundwater inflow, and precipitation, so the berm would ensure sustained ponding through preventing outflow of perched surface waters. The berm would also preclude tidal influence during anything but the most extreme storm tides. Lastly, it would provide a high elevation upland area for use as refuge by wildlife within the otherwise low-elevation marsh floodplains during extreme tide or high water conditions. A low berm would also be created on either side of the fully realigned Tomasini Creek to ensure that surface waters within the created marsh do not drain into the creek.

As with the West Pasture, most of the East Pasture is wetland, with the exception of the southernmost portions of the pasture. The created marsh was deliberately situated in an area with a small watershed and seasonal to perennial groundwater inflow contribution to ensure that the proper hydrology is present for breeding of California red-legged frog. There are no non-jurisdictional or upland areas in the vicinity of the created marsh in which these berms

could be located to avoid or minimize impacts to wetlands. The only option for avoidance would be under Alternative A, where the Tomasini Triangle freshwater marsh and associated berm would not be created. The Tomasini Triangle freshwater marsh is not included in Alternative A, because retention of levees in the West Pasture would reduce potential impacts to existing freshwater breeding habitat. However, as noted above, the scope of restoration under Alternative A is also considerably reduced, limiting the ability of Alternative A to fully meet the proposed project's purpose and objectives.

Floodplains

One of the objectives of the proposed project is to provide the public the opportunity to experience and enjoy the restored wetland through providing public access opportunities that do not impact wetland function. The proposed location for the ADA-compliant viewing platform would allow direct access from the existing White House Pool County park parking lot to the viewing platform adjacent to Lagunitas Creek via a 160-long ADA-compliant trail. The ADA-compliant vault toilet facility would be constructed at the location of the current facility at the northwesten corner of the parking lot.

As the entire Project Area is located within a 100-year FEMA-designed floodplain, it would not be practicable to avoid floodplain impacts by relocating the viewing platform and vault toilet facility to another non-floodplain area within or immediately adjacent to the Project Area. Under Alternative D, the southern perimeter through-trail proposed under Alternatives A-C would be converted to a spur trail through elimination of the bridge component from project-level consideration.

Should the Park Service eventually consider construction of a non-vehicular bridge over Lagunitas Creek through a separate environmental analysis process, the location was selected by the Park Service and CSLC, because it: 1) represents one of the narrowest sections of the Lagunitas Creek channel in the Project Area and therefore enables construction of the bridge without having to place footings within the active floodplain; 2) allows direction connection of the enhanced existing trail on the Giacomini Ranch East Pasture levee to the existing trail in the White House Pool County park; and 3) minimizes the amount of riparian habitat that would have to be removed on either end of the bridge, because there are already gaps in the riparian canopy.

Mitigative Actions

Wetlands

Under the preferred alternative, Alternative D, losses of wetlands from creation of berms and high tide refugia would be offset by creation of approximately 32.2 acres of wetland in the Giacomini Ranch through 1) complete levee removal; 2) restoration of filled and compacted ranch roads; 3) excavation of spoil piles, berms, manure disposal areas, and upland areas; and 4) excavation and lowering of non-jurisdictional uplands to intertidal elevations, resulting in a net gain of approximately 30.4 acres of wetlands. Most of the wetland gain in the Giacomini Ranch would come from an increase in estuarine wetlands. While the percentage increase in palustrine wetlands would be smaller than that of estuarine wetlands, it would be sufficient to offset loss of 1.82 acres of palustrine wetlands and would, therefore, represent in-kind mitigation.

Overall, then, permanent loss of 1.82 acres of wetland from construction of high-tide refugia would be offset by passive and active restoration, resulting in a net gain of more than 30.4 acres. These mitigative actions would result in an overall 17:1 mitigation ratio.

Floodplains

Generally, the Park Service stipulates that the mitigation should provide protection up to the level of the applicable regulatory floodplain (NPS Floodplain Procedural Manual Section VI.G.).

Mitigation may consist of any combination of seasonal closure, structural flood protection measures, specific actions to minimize impacts to floodplain natural resource values, effective flood warning, and flood evacuation (NPS Floodplain Procedural Manual Section VI.G.). During extreme storm events that would cause overtopping of creek banks, County and Park Service staff would post access roads to facilities as closed if County and Park Service personnel can reach the structure without endangering their own safety. In the event of catastrophic flooding, it would be highly unlikely that pedestrians and bicyclists would attempt to use facilities, because most of the access points would be inaccessible.

Compliance

Because the proposed project would affect wetlands and floodplains, the Park Service and CSLC would have to comply with a number of federal, state, and local laws and regulations governing impacts to wetlands, floodplains, and other aquatic habitats.

Clean Water Act Section 404. Section 404 (33 U.S.C. 1344) of the Clean Water Act prohibits the discharge of fill material into navigable waters, tributaries to navigable waters, and special aquatic sites of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (the Corps) and U.S. Environmental Protection Agency. The proposed project would involve removal or breaching of levees on creeks, realignment of creeks, and excavation and/or permanent or temporary fill in special aquatic sites such as wetlands. Because of this, the project will require Section 404 permits from the Corps. The Corps has already reviewed and verified the delineation of jurisdictional wetlands and other waters in the Project Area.

Clean Water Act Section 401. Under Section 401 (33 U.S.C. 1341) of the Clean Water Act, states and tribes can review and approve, condition, or deny all Federal permits or licenses that might result in a discharge to state or tribal waters, including wetlands. The proposed project has the potential to affect water quality within the Project Area and in downstream water bodies. Because of this, the project will require Section 401 certification from the San Francisco Regional Water Quality Control Board.

Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. §43). Predating Section 404, federal jurisdiction over activities to navigable U.S. waters was limited to "waters" subject to Section 10 of the Rivers and Harbor Act (1899). The Corps continues to oversee Section 10 jurisdictional waters, which are navigable waters that are subject to the ebb and flow of the tide, and/or those that are presently used, have been used in the past, or could be used for interstate transport or foreign commerce. Section 10 jurisdiction extends to mean high water (MHW) and includes tidal areas presently subject to tidal influence, as well as unfilled areas currently behind levees that were historically below MHW. The proposed project would involve removal or breaching of levees, portions of which are currently below MHW, and potentially excavation of tidal creeks in areas that were historically below MHW. Applications for a Section 10 permit would be submitted to the Corps concurrently with the Section 404 permit.

Coastal Zone Management Act of 1972, as amended through P.L. 104-150, The Coastal Zone Protection Act of 1996 (16 U.S.C. §1451 et seq.). Within California, the California Coastal Commission (CCC) administers the state program (California Coastal Act) for implementation of the federal Coastal Zone Management Act (CZMA). Any action by a federal agency such as the Park Service requires a federal consistency determination by the CCC as required by CZMA. The CCC manages fill, dredge, and other non-point activities affecting wetlands. In California, the Coastal Zone is broken into Local Coastal Program units that specifically oversee land use and management of resources within their jurisdiction. This project falls within the Coastal Zone and has wetlands and riparian/stream buffer areas that would be subject to oversight under the Coastal Act and local LCP. The Park Service would make a determination regarding consistency and submit to the CCC for concurrence.

Porter-Cologne Act (California Water Code, Division 7, §13000). The Porter-Cologne Act is the principal state law governing water quality control in California. The Regional Water

Quality Control Boards (RWCCB), which also administer Section 401 of the federal Clean Water Act, govern the nine hydrologic regions into which California is divided, adopting regional water quality control plans (basin plans) for their respective regions. Water quality control plans designate beneficial uses of water, establish water quality objectives to protect those uses, and provide a program to implement the objectives. The San Francisco RWQCB has established beneficial uses and associated water quality criteria for Tomales Bay and Lagunitas Creek. The portion of Lagunitas Creek that runs through the Project Area is owned and managed currently by the CSLC.

Lake and Streambed Alteration Agreement (Fish and Game Code, §1600 et seq). Any person, state or local governmental agency, or public utility must notify the California Department of Fish and Game (CDFG) before beginning an activity that will substantially modify a river, stream, or lake. CDFG has historically had a more limited jurisdiction than the Corps, focusing specifically on lakes, major tidal sloughs, rivers, and streams. CDFG also typically includes riparian areas adjacent to rivers and streams within its jurisdiction. Because the proposed project would affect creeks under state ownership, a Lake and Streambed Alteration Agreement may be required.

Conclusion

While the purpose of the proposed project is wetland restoration, there would be impacts to wetlands and floodplains associated with construction of low berms, upland refuge areas for wildlife, and bridges for public access. The total acres of wetlands permanently impacted would exceed 0.25 acres, so the proposed project would not meet requirements for an exception to preparation of a Statement of Findings despite the fact that the actions are "designed specifically for the purpose of **restoring** degraded (or completely lost) natural wetland, stream, riparian, or other aquatic habitats or ecological processes" (NPS Wetlands Procedural Manual, Section 4.2.A.1.e). The proposed project would also involve placement of a small number of public access facilities in a FEMA-designed 100-year flood hazard zone, which is considered a Class I action under Park Service floodplain management procedures and therefore also subject to Statement of Findings requirements. An alternative has not been formally chosen for implementation, but the Park Service and CSLC have chosen Alternative D as the preferred alternative in the final EIS/EIR (FEIS/EIR). Therefore, this document represents a Preliminary Statement of Findings for Wetlands and Floodplains.

The Park Service and CSLC believe that there are no practicable alternatives to permanent loss of 1.82 acres of degraded palustrine wetlands and 1,100 square feet of Class I development in the FEMA-designated 100-year floodplain. In designing Alternative C, the Park Service and CSLC strived to avoid impacts to wetlands and floodplains, particularly as the purpose of the proposed project is to restore natural wetland hydrologic and ecological processes and functions to a significant portion of the Project Area.

Wetland impacts that cannot be avoided are minimized by trying to locate the construction footprint for small berms and refugia in non-jurisdictional or upland areas to the extent possible. Wetland impacts that cannot be avoided or minimized would be mitigated at approximately an 171:1 ratio, with loss of 1.82 acres of degraded palustrine wetlands replaced in-kind with higher quality and better functioning restored palustrine wetlands. There would also be temporary impacts to wetlands from stockpiling of construction equipment and materials, but these impacts would be "directly associated with and necessary for implementing the restoration" and can therefore be excepted as described under Section 4.2.A.1.e.

Floodplain impacts that cannot be avoided are minimized by locating the viewing platform, vault toilet facility, and, should other access options not prove viable, the potential future non-vehicular bridge outside of the active floodplain. In terms of the bridge, which would be analyzed through a separate environmental analysis process, the bridge elevations would be designed high enough to allow for unimpeded conveyance of larger flood flows. Floodplain

impacts that cannot be avoided or minimized would be mitigated to the extent practicable by closing the structure during extreme flooding, although posting of closure signs may ultimately depend on the ability of County and Park Service staff to safely access this area during flooding.

In general, the purpose of the proposed project fully meets the Park Service directive to restore wetlands and floodplains. The proposed project would directly comply with Park Service policy to restore wetlands to pre-disturbance conditions, when natural wetland characteristics or functions have been degraded or lost due to previous or ongoing activities (NPS Wetlands Procedural Manual, Section 2.2.G). Alternative D would be consistent with the Park Service policy of no net loss wetlands in that there would be a net gain of approximately 30.4 acres of estuarine and palustrine wetlands from removal of levees, restoration of filled and degraded ranch roads, removal of spoil piles and other earthen fill, and creation of freshwater marsh ponds (NPS Wetlands Procedural Manual, Section 2.2.A). It would also meet Park Service directives to "restore natural floodplain values previously affected by land use activities within floodplains" and to "avoid …floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks" (NPS Floodplain Procedural Manual, Section II). Lastly, one of the objectives of the proposed project is to incorporate opportunities for public enjoyment and education through public access that do not disrupt natural wetland functions, which meets another Park Service directive (NPS Wetlands Procedural Manual, Section 2.2.H).

The Park Service, therefore, finds that the proposed project is in compliance with Executive Order 11990: "Protection of Wetlands" and Executive Order 11998: "Floodplain Management."

References

Brinson, M. M. (1993). A Hydrogeomorphic Classification for Wetlands. August 1993 - Final Report, Wetlands Research Program Technical Report WRP-DE-4.

Clearwater Hydrology and Nichols-Berman (2002). Marin Countywide Plan: Flooding Technical Background Report. Chico and Benicia, California, Prepared for the Marin County Community Development Agency, San Rafael, California.

Collins, J. N., E. Stein, et al. (2003). Draft California Rapid Assessment Method (CRAM) for Wetlands, v 1.7, San Francisco Estuary Institute and Southern California Coastal Water Research Project.

Collins, J. N., E. Stein, et al. (2004). Draft California Rapid Assessment Method (CRAM) for Wetlands, v 3.0: User's Manual and Scoring Forms, San Francisco Estuary Institute and Southern California Coastal Water Research Project.

Cowardin, L. M., V. Carter, et al. (1979). Classification of Wetlands and Deepwater Habitats of the United States. Washington, D.C., U.S. Department of the Interior, Fish and Wildlife Service, FWS/OBS-79/31.

KHE (2006). Hydrologic Feasibility Assessment Report: Giacomini Wetland Restoration Project. Point Reyes National Seashore. Point Reyes Station, California, Prepared for Point Reyes National Seashore.

NPS. 1998. Procedural Manual #77-1: Wetland Protection. http://www.nature.nps.gov/wetland

NPS. 2004. Procedural Manual #77-2: Floodplain Management. http://www.nature.nps.gov/rm77/floodplain.cfm

NPS. 2006. 2006 Management Policies, National Park Service.

Parsons, L., C. Donovan, and Amelia Ryan. 2004. Wetlands Mapping and Assessment in the Tomales Bay Watershed. Point Reyes Station, California, Point Reyes National Seashore.

Parsons, L.S. 2005. Delineation of Potential Jurisdictional Wetlands and "Other Waters." Giacomini Wetland Restoration Project. Marin County, California. Point Reyes National Seashore. Natural Resources Management Division. Water Resources Section. Point Reyes Station, Calif. 94956.

Parsons, L., L. Allen, and A. Ryan. 2005. Delineation of Wetlands and Deepwater Habitats: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

California State Lands Commission

State of California

Point Reyes National Seashore
Golden Gate National Recreation Area

National Park Service
U. S . Department of the Interior

FINAL

Giacomini Wetland Restoration Project

Environmental Impact Statement / Environmental Impact Report

VOLUME II - Response to Comments

June 2007

Section 1

Response to Comments

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
Purpose and Objectives	
C-1	The Park Service should retain the original purpose of the project that was to remove non-compatible agricultural uses, enhance view opportunities, preclude future development, and create clear undistorted project boundaries.
	Response: As discussed in Chapter 1 of the DEIS/EIR, when the National Park Service (Park Service) signed the Memorandum of Understanding with the California Department of Transportation (CalTrans), the California Coastal Commission (CCC), and the Gulf of the Farallones National Marine Sanctuary (GFNMS), it stated that the purpose of the future project would be "restoring freshwater and saltwater wetlands." While the legal agreement between CalTrans and the park only obliges the park to mitigate 3.6 acres, all agencies agreed that more fully restoring lands on the acquired property was the ultimate goal, and the MOU called for restoration of a "significant portion" of the historic marsh. Transfer of the mitigation money to the Park Service was approved by the CCC on the condition that the Park Service would either create subtidal and intertidal habitat comparable in character to the area that was impacted by the road repair on State Route 1 near Lone Tree Creek OR restore previously degraded or filled marine or the removal of historic fill, improvement of water circulation, and such other steps as will create or improve habitat for fish, water birds, and other marine or marine-related species. In a separate agreement with the Park Service, CalTrans also stipulated that restoration on the Giacomini Ranch would be in a "manner consistent with the general plan set forth in the feasibility study (PWA et al. 1993). The feasibility study (PWA et al. 1993) established a number of restoration goals, none of which included the objectives listed in the comment letter. During the initial scoping period for the proposed project, the agencies took into account the mitigation requirements imposed by the MOU and agreement with CalTrans and developed a project purpose that refined and improved upon the Park Service's original stated goal of restoring freshwater and saltwater wetland such that natural hydrologic and ecological processes and functions would be restored in a significant portion of the Project Area.
C-2	***Concern Statement (Project Purpose and Priority for Restoration vs. Public Access)***: Several commenters stressed that they felt that restoration of natural processes and habitats should be primary objective of the proposed project, not public access. Restoration should be a priority for improving water quality in Tomales Bay and for special status species habitat, which the Park Service has a legal obligation to protect and enhance. Human activities would degrade wildlife habitat and wetlands, so restoration actions should minimize human activities in the Project Area, particularly in creek and riparian areas. For this reason, restoration actions should maximize natural quiet and minimize non-natural visual intrusions.
	Response: As discussed in Chapter 1 of the DEIS/EIR, the proposed project has established restoration of natural hydrologic and ecological processes and functions as the primary purpose of the proposed project. However, in keeping with the fact that "providing opportunities for appropriate public enjoyment is an important part of the Service's mission" (Park Service 2006, Section 8.1), the agencies have also incorporated provision of public access opportunities that do not conflict with the project's primary purpose as an objective of the proposed project. Although not identified as project objectives, the Park Service also places high value on preserving, to the greatest extent possible, natural soundscapes and landscapes, as well (Park Service 2006; Section 4.4.2.4 and 4.9).
C-3	Construction of the Southern Perimeter Trail violates the project's stated purpose that "public access opportunities should not conflict with the project's purpose of restoring natural hydrologic and ecological processes and functions."
	Response: The agencies felt that the southern perimeter trail would not conflict with the purpose of the project for several reasons. First, because most of the proposed trail would be in an area with an existing trail, there would be very little additional impacted expected relative to existing conditions in terms of impacts on wetlands and riparian habitat and existing wildlife habitat. Most of the actions in this area represent enhancement of existing public access facilities rather than construction of new ones. Increased visitor use of these enhanced facilities would result in only negligible to minor additional impacts to hydrologic processes, riparian habitat, and wildlife use. For example, the proposed bridge over Lagunitas Creek would be developed such that there would

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	be no footings in the creek that would impinge upon hydrologic processes during smaller flood flows. During larger flood flows, overbank topping of the Giacomini Ranch East Pasture creek bank would occur upstream of the proposed bridge, thereby decreasing flood flow velocities around the bridge infrastructure. The proposed trail was developed as a weather-dependent trail, so flooding of the bridge and associated trail would be anticipated during moderate- to large storm events.
C-4	***Concern Statement (Project Purpose and Elimination of Public Access)***: Several commenters stressed that they felt that there should be no new public access facilities constructed as part of the proposed project. Human activities would degrade wetlands and wildlife habitats, and there is enough public access within the Point Reyes-Tomales Bay area already.
	Response: As discussed in Chapter 1 of the DEIS/EIR, Park Service Management Policies directly address the recreation and educational values of wetlands, noting that, "when practicable, the Service will not simply protect, but will seek to enhance, natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions" (Park Service 2006; Section 4.6.5). By incorporating public access as a project objective, the agencies are demonstrating that they are committed to incorporating opportunities for the public to learn about the value of wetlands, the problems facing Tomales Bay, and the restoration process, as long as the opportunities do not conflict with the primary purpose of the project. In addition to incorporating trails, viewing areas, interpretative exhibits, and volunteer/educational opportunities, the Seashore and the CSLC also plan to enable people with disabilities to experience wetlands and the restoration process by providing appropriate public access facilities for those with disabilities. The agencies have developed public access opportunities that would not conflict with restoration or degrade wetland and wildlife habitats. While there are abundant public access opportunities in the Point Reyes region, including opportunities to view wetlands (e.g., Estero Trail, Muddy Hollow Trail, Coast Trail, etc.), the agencies want to enhance opportunities for the local community and Park visitors to experience and enjoy the restored wetland.
C-5	***Concern Statement (Project Purpose and Need for Public Access)***: Several commenters felt that the proposed project should include public access and opportunities to view the restored wetland. Appropriately designed public access would not degrade wetland and wildlife habitats and would improve public transportation safety and would decrease vehicular traffic and associated damage to natural resources from emissions. The Park Service is a national agency that needs to serve the American public that pays for it, not just the local community. By providing access, Americans can become more physically active and gain opportunities to learn about wetlands through interpretation and educational opportunities.
	Response: See Responses to C-2, C-3, and C-4, which address many of the points raised in Concern Statement #5. The agencies has incorporated opportunities in many of the alternatives that address the local community's previously stated desires and needs for greater public access safety and connectivity between communities. The prevalence of wetlands and privately owned lands at the perimeter of the Project Area limit opportunities to incorporate public access options in the Project Area that would provide exercise, but there are plenty of nearby through- and loop trails within the Park and on adjacent County, water district, and state park lands that would provide these types of opportunities.
Process	
C-6	***Concern Statement (Public Input***): Commenters believed that the public involvement process was inadequate. Some felt that it was biased toward local residents; others felt that it should be restricted to local residents.
	Response: In a recent study on the effectiveness of NEPA, one of the five key elements of the NEPA process that were considered critical to its effective and efficient implementation included the extent to which an agency provides information to and takes into account the views of the surrounding community and other interested members of the public during its planning and decision-making process (CEQ 1997). As the study noted, the "success of a NEPA process heavily depends on whether an agency has systematically reached out to those who will be most affected by a proposal, gathered information and ideas from them, and responded to the input by modifying or adding alternatives…..' (CEQ 1997).

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Since the public scoping period and meeting in fall 2002, the Park Service and CSLC have incorporated numerous opportunities for public involvement, including 1) a series of alternative workshops in 2004 for agencies, adjacent landowners, and the general public; 2) public access workshops in 2005 for adjacent landowners and the general public; and 3) a public meeting and 45-day review period for the DEIS/EIR in 2007. All of these public involvement efforts included either formal or informal public comment periods. Because the Park Service is a national agency who serves people throughout the United States, scoping efforts were not limited to the local community, even though the proposed project may have the most effect on that community. While public meetings were all held in west Marin, the public scoping period in 2002 and the public comment period in 2007 were all noticed in the Federal Register, which is a nationally distributed daily publication for rules, proposed rules, and notices of federal agencies and organizations. Notices were also published in the California State Clearinghouse, which coordinates the state level review of environmental documents pursuant to the California Environmental Quality Act (CEQA), and copies of the document were distributed to select university, county, and archival libraries throughout California, as well as outside of California. Finally, notices were also mailed to the Seashore's general mailing list, which includes organizations, agencies, and people throughout California and the United States. We believe that these extensive public outreach efforts have adequately informed and involved both the local community and interested or affected members across the country.
C-7	The Park Service relied too heavily on public comment when designing and choosing alternatives rather than on scientifically defensible information.
	Response: Both the NEPA and CEQA environmental review processes encourage the incorporation of both public input and scientific information in planning, developing, and analyzing projects. CEQ requires agencies to make "diligent" efforts to involve the interested and affected public in the NEPA process (1506.6) and to "encourage and facilitate public involvement in decisions which affect the quality of the human environment" (1500.2 (d)). Under CEQA, an agency must solicit and respond to comments from the public and other agencies concerned with the project. (Title 14, Section 15002(j), also Sections 15073, 15086, 15087, and 15088.) The public has an important role in the NEPA and CEQA processes, particularly in providing input on what issues should be addressed in environmental documents, how alternatives should be added or modified, and how well the documents evaluate potential impacts of a proposed project. Scientific information is used to guide development of reasonable alternatives, evaluate existing conditions, and, perhaps most importantly, evaluate the potential environmental and social consequences of proposed projects. NEPA requires an objective, high-quality scientific analysis of impacts that the proposal or its alternatives may create (1500.1 (b)). CEQA requires that decisions be informed and balanced (Title 14, Section 15003(j)), although it does not require "technical perfection" (Title 14, Section 15003 (i)). As guided by these sections of code, the agencies incorporated both public input and scientific information during the appropriate stage or part of the planning process.
C-8	Is the DEIS/EIR intended to serve as the environmental review for the prospective in-stream flow dedication?
	Response: Yes, the DEIS/EIR incorporates the environmental review for the prospective in-stream flow dedication. It is incorporated as a proposed management action common to all alternatives in Chapter 2, and the effects of the proposed in-stream dedication are evaluated under Public Services – Municipal Water Supply and Distribution.
Impact Analysis - General	
C-9	The DEIS/R should compare impacts from a pre-disturbance baseline condition to each alternative rather than to existing conditions.
	Response: Environmental compliance documents are intended to help the interested public understand how conditions would change relative to existing conditions should one of the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	proposed alternative (Action Alternatives) be implemented or if no action or project (No Action) is implemented. NEPA and CEQA require that alternatives be evaluated with respect to baseline or existing conditions. The baseline is essentially a description of the affected environment at a fixed point in time, whereas the No Action alternative evaluates what would happen and what changes might occur in existing or baseline conditions, even if "No Action" is taken. Often, baseline conditions in NEPA and CEQA are established as the conditions that existed at the time the Notice of Intent or Notice of Preparation was issued. Because evaluation of potential impacts often involves technical and/or quantitative analysis of how conditions would change under various alternatives relative to existing conditions, comparison of each alternative to some historical baseline condition would be difficult, because there is not enough information available typically to accurately describe resource conditions during that period of time. However, while NEPA and CEQA guidance do not support using pre-disturbance conditions for evaluating the intensity of impacts, the agencies notes that restoration is a purpose of the proposed project and the objective of taking action and, therefore, the alternative comparison at the end of Chapter 2 and the impact evaluation in Chapter 4 does provide a considerable amount of comparison between alternatives under the various impact topics.
C-10	***Concern Statement (Land Use - General and Agricultural)***: One commenter felt that limiting public access would help to better preserve the historic character of Point Reyes Station. Another commenter felt that restoration would unacceptably reduce the amount of land devoted to agriculture. A third felt that the expanded range of thresholds used to evaluate impacts to agricultural lands based on the Land Evaluation and Site Analysis needed to be better explained.
	Response: The DEIS/EIR addresses these topics under Land Use and Planning. Under CEQA, the County of Marin requires agencies to address how projects would comply with local land use policies, including whether the project would "result in substantial alteration of the character or functioning of the community or present or planned future use of an area." In Chapter 4, Land Use and Planning – General, the DEIS/EIR notes that the proposed project would result in no more than minor changes to the character of the community. It also evaluates how the proposed project would affect agricultural land uses and the viability of agriculture in West Marin. The EIS/EIR uses a quantitative approach to evaluate impacts to Agricultural Resources, Operations, or Adjacent Agricultural Land Uses developed by the State Department of Conservation called the Land Evaluation and Site Analysis (LESA). Based on the results of the LESA analysis, the proposed project would have no more than minor impacts on adjacent agricultural land uses. A more complete description of this analysis can be found in Chapter 4, Land Use and Planning – Agricultural Land Use and, in the Final EIS/EIR, Appendix C. These sections have also been updated to include a more complete explanation of the thresholds used to evaluate and categorize impacts as "Negligible," "Minor," "Moderate," and "Major or Substantial."
C-11	***Concern Statement (Air Resources - Air Quality)***: One commenter requested that the document include the projected N0x emissions from the proposed project and whether it conforms to the State Implementation Plan (SIP): this information is needed to demonstrate compliance with the SIP. Another felt that the DEIS/R did not adequately address impacts to air quality from dust and construction vehicles traveling over sandy roads and that these impacts should be mitigated through spraying of construction roads with water.
	Response: The DEIS/EIR addresses these topics under Chapter 4, Air Resources – Air Quality. In response to the comment on projected NOx emissions, the agencies have added a table in the FEIS/EIR that shows projected emissions of all pollutants emitted during construction and implementation of the proposed project. The agencies have also incorporated additional discussion in the FEIS/EIR regarding whether alternatives conform to the State Implementation Plan (SIP). According to Bay Area Air Quality Management District (BAAQMD), fine particulate matter (PM10) or dust is the pollutant of greatest concern with respect to construction activities (BAAQMD 1999). The analysis of potential air quality impacts under Chapter 4, Air Resources-Air Quality does address generation of dust or PM10 during construction. Based on the amount of cubic yards of material excavated, the impacts would be considered negligible under every alternative. In addition, the agencies would be implementing Best Management Practices or Mitigation Measures designed to reduce the generation of dust or PM10, including, where possible, use of water trucks to spray down major construction routes. More detail on mitigation measures

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	related to Air Quality can be found in Chapter 2 – Impact Avoidance and Mitigation Measures and Chapter 4 – Air Resources – Air Quality, Proposed Mitigation Measures.
C-12	***Concern Statement (Air Resources - Noise and Soundscapes)***: At least one commenter felt that the DEIS/EIR did not adequately disclose or mitigate noise impacts from construction of the proposed project to local residences. Another commenter noted that there would be noise impacts to residences along Levee Road whether the southern perimeter trail was routed across a bridge across Lagunitas Creek or on Levee Road and across the Green Bridge (see Alternatives Eliminated).
	Response: We disagree that the analysis of noise impacts is inadequate or that mitigation has not been thoroughly discussed or disclosed. The DEIS/EIR addresses impacts from construction noise to all residential areas on the Project Area perimeter and has disclosed that impacts in areas could be Major or Substantial, if they are not mitigated. Within very specific areas that are directly adjacent to construction zones, which are called sensitive construction areas in the DEIS/EIR, construction contractors would be required to implement noise-reducing Best Management Practices (BMP). Within sensitive construction zones, construction would be limited to the hours of 8 a.m. and 6 p.m. Monday through Friday, with weekends only permissible under authorization by the Park Service and CSLC. All equipment would have sound control devices that are no less effective than those provided by the original equipment and would have muffled exhaust. In addition, contractor would be required to maintain properly tuned equipment and limit idling time to 5 minutes and limit the number of concurrently operating pieces of construction equipment within the Sensitive Construction Area. In addition, the Construction Manager would notify adjacent residences in advance of construction and, if properly notified, potentially reschedule construction activities. These mitigation measures would be expected to reduce, but not necessarily eliminate, impacts from noise to certain sensitive noise receptors or residences, which is signified within the DEIS/EIR by the fact that impacts after mitigation are characterized as "Moderate" or "Less than Significant," but not No Impact. Unfortunately, there are no mitigation measures available that would completely eliminate impacts during construction. In terms of the second comment, noise impacts from public access along Levee Road and the Green Bridge were not evaluated, because this particular alternative was eliminated from at least project-level evaluation in this document. In the FEIS/EIR, Alternative D now incorporates the potential for the Park Service to work cooperatively with the County of Marin on expanding public access on the southern perimeter of the Project Area, including potentially reevaluating use and improvement of Levee Road in a future environmental document. See C-103 for more detail.
C-13	The Park Service should be aware of a potential for willow tree invasion from south of the Project Area.
	Response: This stand of willow was mapped both as part of the vegetation and wetland maps prepared for the proposed project. This stand of willow appears to be sustained by sheetflow and pooling of groundwater that emerges at the base of the Point Reyes Mesa slope. While it is possible that this willow stand would expand westward were there less public access use of the Green Bridge County park, it is likely that, even without trails, the stand would not expand much further westward, because it is at the extent of its current limit given existing hydrologic patterns and high elevations currently present in the Green Bridge County park.
C-14	***Concern Statement (Vegetation Resources - Public Access Impacts)***: Several commenters felt that inclusion of public access would degrade natural habitats, particularly those sited along riparian corridors. A few questioned whether some of the proposed trails would violate County, Local Coastal Plan, Point Reyes Community Plan, or California Department of Fish and Game policies by intruding into and potentially degrading riparian habitat. At least one felt that the Park Service should offer protection for those habitats that would surpass that of local policies. Another commenter was concerned that the bridge across Lagunitas Creek would create additional pressure to build more trails that would intrude further into wetlands.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Response: As noted under C-2, most of the public access trails proposed in riparian corridors are actually improvements of existing trails or roads and would not involve removal or destruction of existing riparian habitat, with the possible exception of a the eastern perimeter through-trail under Alternatives A and B and the bridge proposed under Alternatives A – C. Also, the possible extension of the southern perimeter trail to Inverness Park in the future could result in loss of riparian vegetation along the eastern edge of Sir Francis Drake Boulevard. While the above referenced policies are discussed in Chapters 3 and 4, Vegetation Resources, we have added information to supplement the discussion of impacts to these policies in response to commenters' concerns. To summarize this additional analysis, some of the proposed trails could violate Local Coastal Plan and Point Reyes Station Community Plan policies or objectives on development within riparian and Point Reyes Mesa bluff corridors, specifically Alternatives A and B. A more complete discussion of this issue can be found in Chapter 4, Vegetation Resources, of the FEIS/EIR.
C-15	***Concern Statement (Fish and Wildlife Resources- Noise-Related Impacts)***: Several commenters felt that noise from public access facilities would adversely impact use of the restored Project Area by wildlife. Public access sited along riparian corridors would also unacceptably degrade wildlife habitat. At least one commenter felt that the DEIS/EIR was inadequate, because it did not fully disclose negative impacts to wildlife and their habitats from trails. Another questioned whether the document had adequately studied the potential for cumulative impacts to wildlife from viewing areas in both the Park Service and County-managed lands. This commenter felt that the total number of viewing areas needed to be maintained at existing levels to ensure that there was no increase in cumulative impacts.
	Response: Analysis of changes in wildlife habitat and use did take into account potential disturbance from visitation, however, because changes are evaluated relative to the continuation of existing conditions, which, in this case, involved operation of a dairy, with several herds or strings, operation of All-Terrain Vehicles (ATVs), backhoes, trucks, and other farm equipment, the impacts of public access were considered relatively minor by comparison and overshadowed by the improvement yielded by the shift from a dairy to a park. Similarly, impacts to wildlife from visitation are also evaluated relative to continuation of existing public access conditions. These existing conditions include evaluation of existing public access and associated impacts on both Park Service (Giacomini Ranch East Pasture and West Pasture north levee, Tomales Bay Trail, Olema Marsh) lands and County park (White House Pool and Green Bridge County parks) lands. This means that the increase in impacts that may occur from adding more viewing opportunities to an area with established viewing areas at White House Pool and Green Bridge County parks is actually assessed as a project impact in the DEIS/EIR rather than a cumulative impact. Relative to the degree of existing use and viewing, increases in visitation were characterized as causing no more than minor additional impacts to wildlife habitat and use. To ensure that these conclusions are clear to the reader, some clarifying language has been incorporated into the discussion in Chapter 4, Fish and Wildlife Resources.
C-16	The impact analysis for salmonids under Fish & Wildlife appears incorrect, because Alternatives C and D are both considered to offer the same increase in aquatic edge habitat even though there's an increase in tidal channel creation under Alternative D.
	Response: As described in Chapter 2 of the DEIS/EIR, there is actually a small increase in creek creation and a small decrease in tidal creek creation under Alternative D relative to Alternative C. While Tomasini Creek would be fully realigned into one of its historic alignments, creating more total creek and backwater channel relative to Alternative C, much of the upper portion of the new Tomasini Creek within the Project Area would be only tidally influenced in the late summer and early fall when freshwater flows drop and would, therefore, would not be considered a tidal creek. In addition, the small starter tidal creek off Lagunitas Creek proposed in Alternative C was not included under Alternative D in the DEIS/EIR. However, based on the impact thresholds established, Alternatives C and D were considered comparable, because both would offer a Major or Substantial beneficial improvement or more than 50 percent increase in the extent of aquatic edge available as rearing habitat for salmonids. In the FEIS/EIR, Alternative D has been modified to include the small starter channel, so the total amount of tidal channel creation would be approximately equal between Alternatives C and D.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
C-17	***Concern Statement (Public Health and Safety - Disease Vectors)***: One agency commented that the interim restoration period and certain components of the post-construction Project Area such as the freshwater marsh in the East Pasture would require close monitoring to ensure that mosquito breeding conditions are not exacerbated. Mitigation for an increase in mosquito numbers, particularly those of the *Culex* genus, should include control efforts, as well as vegetation and nutrient management plan.
	Response: Based on Park Service Management Policies (2006), native organisms such as mosquitoes that are often by perceived by the public as "pests" are viewed as natural elements of the ecosystem and are allowed to function unimpeded, except under certain conditions. One of these conditions under which native organisms are controlled or managed includes when they pose a human health hazard as determined by agencies such as the U.S. Public Health Service (Centers for Disease Control or the Park Service public health programs; Park Service 2006, Section 4.4.5.1). The Park Service uses an Integrated Pest Management Program to reduce the risk to the public, park resources, and the environment from pests and pest-related management strategies (Park Service 2006, Section 4.4.5.2). Normally, source reduction--eliminating or altering the water so that the mosquitoes cannot breed or complete their life cycle--is the first choice for control (Park Service, IPM Manual). If source reduction is impossible or incomplete, the next tactic to consider should be biological control of the larvae with predators, bacterial insecticides, or growth regulators (Park Service, IPM Manual). Source reduction and vegetation management would not be considered a viable strategy for natural areas, including restored or created habitats such as the freshwater marsh in the East Pasture that is being specifically constructed to pond for a sufficient duration to create habitat for breeding of federally threatened California red-legged frog (*Rana aurora draytonii*). The Park Service would either monitor this area itself or amend its current permit with the Marin-Sonoma Mosquito & Vector Control District (District) such that it could monitor this area, which is adjacent to a rural residential area. Based on the Seashore's West Nile Virus Standard Operating Procedure (SOP), the Seashore would then review monitoring results and decide whether to treat with *Bacillus thuringiensis* (Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable, and does not have measurable effects on other species.
C-18	***Concern Statement (Public Services - Traffic and Transportation- Traffic)***: Several commenters were concerned that the proposed project would increase traffic and congestion in what they felt was an already heavily visited area. Specific traffic concerns raised included whether traffic impacts had been addressed; impacts from construction of the southern perimeter trail; monitoring of traffic and parking availability in Point Reyes Station and mitigation for impacts if they should occur; and the accuracy of concluding that public access would decrease vehicular traffic.
	Response: The DEIS/EIR evaluates impacts to traffic and transportation that would result from potential increases in visitation associated with construction or improvement of public access facilities, as well as from construction of the proposed restoration and public access components, specifically hauling of excavated sediment, mobilization and demobilization of construction equipment, commuting of construction personnel, and traffic delays and temporary road closures caused by construction. The evaluation of impacts did not assume that public access would decrease vehicular traffic. Rather, it assumed that there would be an increase because of increased visitation. However, this increase would be negligible to minor for all alternatives, because the limited through-trail connectivity offered would be less likely to attract visitors interested in longer or more strenuous visitor experiences, and because some local residents would walk or bike to the trails rather than drive. The increase in visitation could cause moderate impacts on parking demand in Point Reyes Station under Alternatives A and B, but some of these impacts were reduced under Alternatives C and D by relocating the existing 3rd and C Street trailhead to the Green Bridge. Because of the relatively minor effects on traffic that would be anticipated to occur, a traffic study and additional mitigation measures are not considered warranted, particularly since there has been a relatively recent traffic study conducted in Point Reyes Station for the Point Reyes Affordable Housing Project (EDAW 2001).
C-19	***Concern Statement (Public Services - Traffic and Transportation-Safety)***: Many commenters brought up the issue of public safety with regards to public access and the proposed siting of public

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	access in various areas of the Project Area. These comments either addressed how proposed public access facilities would increase public safety or would decrease public safety (e.g., siting of Mesa Road spur trail and parking lot off Mesa Road, which has no sidewalk). One commenter stated that the DEIS/EIR was inadequate, because it did not cite levels of bicycle accidents in West Marin and show that safety for public access is currently minimal under existing conditions. Another commenter felt that Alternative C was undesirable, because it could decrease safety for pedestrians by increasing the number of weekend bicycle riders in the Project Area.
	Response: Additional information to address these specific concerns, e.g., the potential for conflict between pedestrians, bicyclists, and cars, has been added to the Visitor and Resident Experience - Public Access Resources of the FEIS/EIR. To summarize that additional information, the proposed project would be expected to have no more than a minor adverse effect on public safety related to factors such as increased usage of roads and road shoulders to access or connect to constructed or improved public access facilities.
C-20	***Concern Statement (Public Services - Municipal Water Supply and Distribution)***: One agency commented that the DEIS/EIR does not adequately evaluate and mitigate for potential impacts to the municipal water supply system from potential increases in salinity intrusion. The document does not adequately discuss: 1) the potential effect of salinity intrusion on the quality of drinking water, specifically the creation of disinfection by-products through the combination of chlorides with the sodium hypochlorite used for disinfection and 2) potential impacts during drought, as well as normal streamflow years. The mitigation measures proposed do not appear adequate to mitigate for potential impacts. The agency suggests that adequate mitigation might involve the Park Service funding an extension of the existing pipeline to the well at the Gallagher Ranch for use during periods when the Coast Guard wells could be impacted by salinity intrusion.
	Response: The agencies have responded to the agency's comments in the following ways: 1) Chapters 3 and 4 have been revised to clarify that salinity intrusion has negative effects on the municipal water supply by not only affecting the taste, but through the creation of disinfection by-products that are also regulated by the California Department of Health Services; 2) The methodology used to evaluate impacts in Chapter 4, Public Services – Municipal Water Supply and Distribution, has been revised to incorporate the potential changes in creek salinities during drought and average-flow periods, and, where necessary, the intensity and nature of impacts have been changed accordingly; 3) Based on hydrodynamic modeling conducted for each of the alternatives, most of the potential impacts from salinity intrusion appear to be caused by incorporation of Olema Marsh into the restoration project. Under Alternatives C and D, hydrologic connectivity of Olema Marsh with Lagunitas Creek would be restored, thereby increasing tidal prism or the volume of tidally influenced waters stored within and discharged during ebb tides from the marsh into Lagunitas Creek. While the prism of Olema Marsh is relatively small compared to Giacomini Ranch, the location of its confluence with Lagunitas Creek is located considerably upstream of that for the Giacomini Ranch, which appears to increase the effect it has on salinities within upstream sections of Lagunitas Creek. Modeling results suggest that, under Alternatives C and D, average chloride concentrations in this reach of Lagunitas Creek would increase by 32 percent over baseline conditions during spring or high tide conditions (>5.5 feet MLLW) under normal-year flows and 27 percent under dry-year streamflow conditions, respectively (KHE 2006a). These impacts would not be expected to alter the quality of the municipal groundwater supply, but rather to affect municipal water supply operations in that it could increase the need for, if not the frequency of, off-tide pumping and the time and freshwater recharge needed to reduce creek-derived chlorides within the aquifer. NMWD currently conducts off-tide pumping during tides greater than 5.9 – to 6.0 feet MLLW to minimize the potential for salinity or chloride intrusion into the groundwater supply system. As noted in the mitigation measures proposed under Alternatives C and D, the agencies have proposed to delay implementation of the major Olema Marsh adaptive restoration elements until: 1) monitoring and further investigation of the relationship between Lagunitas Creek and the alluvial aquifer suggest that increased surface water salinities would not pose a threat to the quality of the municipal water supply; 2) there is new information suggesting that restoration of

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Olema Marsh would not increase salinities or otherwise pose a threat to the quality of the municipal water supply; or 3) NMWD receives funding and moves ahead with construction of a pipeline to the Gallagher Well for use during off-tide pumping conditions. These major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts, which were identified as later-stage restoration elements such that they would only be implemented if initial stage restoration elements did not achieve the desired degree of hydraulic connectivity between Olema Marsh and Lagunitas Creek. As it has done throughout the planning process, the Park Service will continue to meet and work cooperatively with NMWD in trying to gain a better understanding of the dynamics of this complex hydrologic system and to ensure that there are no impacts to municipal water supply from implementation of the proposed project.
C-21	***Concern Statement (Visitor Experience - Public Access)***: Several commenters felt that DEIS/EIR is deficient in assessing the potential impacts of the proposed project on trails and facilities such as bathrooms that are maintained and managed by other agencies such as the County.
	Response: This impact topic was previously addressed under Land Use and Planning – General Land Use as one of the CEQA thresholds contained in the County of Marin's CEQA checklist. In the FEIS/EIR, the discussion of this topic has been expanded and changed to an impact sub-topic in the Visitor and Resident Experience – Public Access Resources section. To summarize this information, some of the public access components proposed under some of the alternatives would affect facilities owned and/or managed by other agencies, specifically the County of Marin Parks and Open Space District's White House Pool and Green Bridge County parks. Effects on these facilities would be expected, however, to be no more than minor and not to substantially degrade or to accelerate degradation of physical facilities.
C-22	***Concern Statement (Visitor Experience - Visual Resources)***: Several commenters felt that transportation corridors, including the proposed bridge over Lagunitas Creek, would degrade scenic views and be aesthetically intrusive. At least one commenter felt that the DEIS/EIR incorrectly characterized the stand of willows that grows on the east side of the Green Bridge County park as being negatively viewed by adjacent landowners.
	Response: With a few exceptions, most of the public access components involve improvement to existing trail or road facilities and would, therefore, not constitute more than a minor impact on visual resources. One of the exceptions is the non-vehicular bridge proposed under Alternatives A-C. As discussed under C-27 below, the height of the bridge would need to exceed 16- to 17-feet NAVD88 to allow conveyance of 10-year flood event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows, including the 1- to 2-feet of freeboard that is typically incorporated. Elevation of adjacent lands in White House Pool County park are approximately 11 feet NAVD88, so the bridge would be elevated anywhere from 6- to 9 feet above the surrounding grade. The bridge would be specifically be designed to visual impacts by building it so that it does not exceed the maximum height of the adjacent 30-foot-high tree canopy or 41 feet NAVD88. In terms of the willows that grow along the eastern perimeter of the Green Bridge County park, the agencies had received comments during earlier public scoping and informal comment periods that suggested that some of the adjacent landowners perceive the willows as an impediment to viewscapes within that particular portion of the Project Area.
C-23	Alternative C will increase noise, traffic, pollution, and/or congestion in residential areas and impinge on ecological processes.
	Response: Please see the following sections of Chapter 4 of the DEIS/EIR for analyses of these impacts: Air Resources – Air Quality; Air Resources – Noise and Soundscapes; Public Services – Traffic and Transportation; Vegetation Resources; and Fish and Wildlife Resources. Alternative C would potentially increase noise, traffic, and pollution, but this increase would be relatively minor: any potential major or significant impacts during construction would be mitigated to moderate or less-than-significant levels. The agencies believe, however, that Alternative C would not impinge ecological processes, but that it would restore natural hydrologic and ecological processes and functions to a significant portion of the Project Area.
Impact Analysis – Hydrologic and Hydraulic Processes and Flooding	
C-24	Water emerging from sub-street drainages under 4th Street, Point Reyes Station, is hydrologically

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	connected to the restoration project; the DEIS/R inappropriately fails to address this connection.
	Response: In Chapter 3, Water Resources – Hydraulic and Hydrologic Processes, the DEIS/EIR references emergence of hillside springs or seep flow from the base of the Point Reyes Mesa. It is likely that water emerging from underneath C Street near 4th Street onto the Giacomini Ranch dairy lot represents one of these groundwater seeps or springs. This groundwater source is evident in many areas on the perimeter of the Mesa by the establishment of dense riparian scrub and marshy areas on the edges of the Mesa or even on its slopes. Discussions with groundwater well drillers in the area and site investigations suggest that the source of these seeps and springs is one or more of the shallower water-bearing alluvial layers that have been documented by groundwater well development in the Point Reyes Mesa terrace. Natural groundwater influences in many of these areas have probably been augmented to some degree by septic systems from the relatively densely populated developments on the top of the Point Reyes Mesa and, in some areas, by non-point source run-off from the town of Point Reyes Station.
C-25	The DEIS/R does not adequately address the effects of sea-level rise.
	Response: Sea-level rise is addressed in both Chapters 3 and 4 of the DEIS/EIR. In Chapter 3, Water Resources – Hydraulic and Hydrologic Processes, the issue of sea-level rise is referenced under a description of Tidal Hydrologic Processes in Tomales Bay. In Chapter 4, Water Resources – Hydraulic and Hydrologic Processes, potential effects of sea-level rise are addressed for each alternative under Tidal Prism. In addition, indirect impacts of this issue are also addressed under Vegetation Resources, Fish and Wildlife Resources, and Public Health and Safety – Flooding, and Public Services – Municipal Water Supply. Based on the current level of uncertainty regarding rate and intensity of sea-level rise, the agencies believe that they have adequately addressed this issue in the environmental analysis.
C-26	***Concern Statement (Mitigation of Impacts from Urban Run-Off)***: Several commenters felt that the Park Service needed to address non-point source runoff from Point Reyes Station in the DEIS/EIR and that these impacts needed to be monitored and mitigated either by the Park Service or the County.
	Response: The issue of non point source run-off is addressed in Chapter 3 of the DEIS/EIR under Water Resources – Hydraulic and Hydrologic Processes, Stormwater Run-off Sources for Project Area. Because the proposed project would not necessarily change the alignment or loading rates of the three known sources of run-off that flows into Lagunitas Creek or the Giacomini Ranch, this issue is not separately addressed in Chapter 4, although it is indirectly addressed by evaluation of the improvement over time in downstream loading rates from Lagunitas Creek into Tomales Bay and in the quality of waters within the Giacomini Ranch East Pasture. The San Francisco Regional Water Quality Control Board has done some monitoring of pollutant loads within these run-off sources (RWQCB 2001). As part of the long-term monitoring program, the Park Service has monitored some of the downstream receiving waters within the Giacomini Ranch (Parsons, *in prep*.). Reduction in pollutant loading within these run-off sources would need to be addressed by agencies responsible for maintaining the stormwater run-off system within the town of Point Reyes Station. In addition, residents could help to decrease pollutant loading through decreasing fertilization of lawns, washing of cars, and other activities that lead to introduction of pollutants into urban run-off.
C-27	Creation of a bridge across Lagunitas Creek will impede **natural hydrological processes**.
	Response: The pedestrian-bicycle bridge proposed under Alternatives A-C would affect hydrologic processes, however, as described in Chapter 4, Public Health and Safety – Flooding, the bridge has specifically been to minimize its impacts on these processes. It would be designed to accommodate flows equal to or greater than those conveyed by the vehicular Green Bridge directly upstream of the Project Area, which only floods under the largest storms. The height of the bridge would be high enough to allow most small to moderate flood flows to pass underneath. During larger storms, the bridge would be inundated such that flows would pass over the deck, but flow velocities would be reduced in this reach relative to upstream locations, because overbank flooding would have occurred, thereby dissipating the erosive energy of flood flows. Based on expected flood elevations in this reach (KHE 2006a), height of the bridge would need to

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	exceed 16- to 17- feet NAVD88 to allow conveyance of 10-year flood event flows and 18.2 to 19.2 feet NAVD88 to allow for conveyance of the 50- to 100-year flood flows. Bridge heights would need to be raised 1- to 2-feet additional vertical feet in order to provide needed freeboard. The southern perimeter trail has been specifically designed as a weather-dependent trail, so public access components would not be designed to necessarily allow access under all conditions. The bridge was specifically proposed for this location, because this particular reach was narrow enough to allow the bridge to be constructed without footings in the active channel or portion of the floodplain that would be flooded on a frequent basis (~every 1.5 – to 2 years). Most of the adverse impacts from bridges come from installation of footings in the channel or active/bankfull floodplain of creeks, so hydrologists recommend creating bridges that span the active floodplain where possible. The amount of armoring or riprapping would be the minimal amount necessary required to protect the footings. This portion of the estuary is a dynamic system, and, so, to some degree, public access would need to be dynamic, too. Should at some point flood flows negatively affect the trail or bridge, public access alignments and infrastructure would be modified to adapt to the changed resource conditions rather than modifying the resources to fit the existing public access alignment. Because of these design features, the agencies believe that the bridge would not necessarily impede natural hydrologic processes, although installation of a bridge is always a less preferable course than finding another alternative that does not involve bridge construction.
C-28	Extensive excavation under Alternatives C and D could result in unacceptably high siltation in Tomales Bay.
	Response: Although excavation would occur under both alternatives, with more in Alternative D, impacts from siltation would be minimized by a number of factors. Most of the excavation under Alternatives C and D would come from removal of levees and construction of tidal creeks. The areal extent of excavation is actually quite limited for these activities relative to the size of the remainder of the Giacomini Ranch, which would remain vegetated following construction. There would be scraping of the top 6 inches of the southeastern portion of the East Pasture to remove weeds, but this area would be seeded and actively revegetated to some degree to minimize erosion and would only be inundated a few times a year, if that. The extent of excavation does increase under Alternative D due to lowering of higher elevation areas to active floodplain and intertidal marshplain elevations, however, this area would also be actively revegetated to minimize erosion. During construction, Best Management Practices would be employed to avoid or minimize the potential for siltation in downstream areas, including installation of siltation control fencing to capture and contain soils loosed during earthmoving and temporary water diversion measures when construction must occur at the toe or within creeks themselves. See Chapter 2 of the DEIS/EIR for more information on Impact Avoidance and Mitigation Measures.
C-29	***Concern Statement (Flooding Effects on County Parks)***: At least one agency commented that the agencies should mitigate for damage caused to County-managed public access facilities by additional flooding caused by the proposed project, including any necessary trail repairs from erosion or other damages or any need to elevate the trails to maintain access. These mitigation measures could include improvement of drainage facilities in the park and parking lot, construction of an elevated boardwalk, or construction of an elevated parking lot.
	Response: Based on hydraulic modeling results, the proposed project would actually decrease vertical flood elevations in the vicinity of County-managed parks, so mitigation measures are not warranted. As described under Public Health and Safety-Flooding, hydraulic modeling conducted for the proposed project shows that all of the action alternatives (Alternatives A-D) would result in a moderate reduction of vertical flood elevations of Lagunitas Creek for the section of creek between Olema Creek and White House Pool under Alternatives A – D. During 10-year flood events, vertical flood elevations could be reduced as much as 0.5 to 0.9 feet (KHE 2006a). In addition, under Alternatives C-D, standing water levels within Olema Marsh would be reduced, which would reduce the severity of flooding of Levee Road and the southern portion of the White House Pool County park. There would be smaller reductions in vertical flood elevations for the Green Bridge County park, similar to that discussed for the eastern portion of Levee Road in Chapter 4 (KHE 2006a).

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
C-30	Will any of the alternatives increase the frequency or severity of flooding on the properties along the east side of Sir Francis Drake Blvd just north of the Project Area towards Inverness? If restoration actions will increase flooding, will the Park Service mitigate adverse impacts to these homeowners?
	Response: Based on hydraulic modeling results, the proposed project would not increase the frequency or severity of flooding for properties north of the Project Area. Hydraulic modeling of vertical flood elevations north of the Project Area and south of open water portions of Tomales Bay suggest that the added floodwater storage created by removing the Giacomini Ranch levees would effectively reduce vertical flood elevations across the entire Lagunitas Creek delta. For example, under Alternative C, vertical flood elevations for properties on the east side of Sir Francis Drake Boulevard directly adjacent to Fish Hatchery Creek could be 0.1 foot lower than under existing conditions, based on modeling results (KHE 2006a). Vertical flood elevations would not increase above those that currently exist under any of the alternatives. These results could change if Lagunitas Creek changed its current channel course. The levees have maintained the current channel alignment in roughly the center of the southern portion of the Bay. If levees were removed, the channel could change course and even reoccupy one of its historic alignments in what is currently the Fish Hatchery Creek channel, which is some distance west of the current channel. This alteration in channel alignment could change the effect of the proposed project in terms of the erosive energy or scour of flood flows and instantaneous peak flood levels, which may lead to damage of adjacent lands and necessitate improvement and strengthening of levees for homes on the east side of Sir Francis Drake Boulevard north of the Project Area.
C-31	Alternatives B-D propose construction of low berms around private properties immediately adjacent to the West Pasture along Sir Francis Drake Blvd; the Park Service should better describe these berms.
	Response: As described in Chapter 4, Public Health and Safety-Flooding, flooding of private properties adjacent to the West Pasture in Inverness Park by Lagunitas Creek could increase under Alternatives B-D. However, hydraulic modeling, combined with detailed topographic surveys, suggests that the effects of these increases in vertical flood elevations would be restricted to the eastern portion of properties that are undeveloped and would NOT affect homes, garages, driveways or the health and safety of residents by limiting access to or by emergency medical or other types of public service personnel. Because of this potential increase in flooding by Lagunitas Creek during certain flood events, the agencies proposed construction of low-elevation earthen berms for some of the lower elevation homes or properties as one of the potential mitigation measures. The DEIS/EIR noted that these berms would probably need to be at least 2- to 3- vertical feet in height to maintain existing flood protection during 50- to 100-year flood events. Additional detail was not provided in the DEIS/EIR, because the dimensions of the berm would depend upon which property it was being built to protect. Any berm constructed would require that the agencies contract with a geotechnical engineer to complete the necessary soil/geotechnical studies and provide design assistance. In addition, any berm design would need to take into account hydraulic issues, including the fact that most of the flooding of these homes is currently caused by tributaries draining the Inverness Ridge, which discharge flow and sediment underneath Sir Francis Drake Boulevard and into the West Pasture. Berms that inhibit the passage of these material or improperly designed berms could exacerbate flooding of properties by these creeks.
C-32	Tidal inundation on the West Pasture may impact adjacent septic systems.
	Response: Implementation of the proposed project would be expected to have no adverse impact on septic systems for homes within the West Pasture (Greg Kamman, KHE, *pers. comm*.). Based on modeling results, removal of levees and increased tidal exchange would improve drainage of both tidal waters and floodwaters relative to the somewhat impounded conditions that exist currently and could actually improve functioning of septic systems by lowering local groundwater tables (G. Kamman, KHE, *pers. comm*.). See Public Services – Wastewater Treatment and Disposal in the FEIS/EIR for additional information. Septic systems for these homes are located within the apex of alluvial fans formed by sediment deposited from outflow of the numerous small perennial Inverness Ridge drainages that flow out into the West Pasture. These systems probably lie anywhere from approximately 3- to 9 feet above the extremely shallow groundwater table that underlies the West Pasture that is fed by strong surface water and

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	groundwater flow from the Inverness Ridge. An increase in tidal exchange with Lagunitas Creek would not affect these systems, because tides would not reach the elevations of the homes and septic systems (maximum tide elevation = 7.0 feet NAVD88), and any effect on tides on the groundwater table through an increase in hydraulic pressure would be expected to be extremely localized and only extend within a few feet of creeks such as Fish Hatchery Creek (Greg Kamman, KHE, *pers. comm*.).
C-33	Various culverts along the Project Area perimeter are proposed for replacement. Before the County approves the work, it will require that detailed hydrology and hydraulic analysis be provided to ensure that the project will not result in any increased risk of flooding. It is also concerned that the project design should incorporate the County's need to maintain county road and culverts, including clearance for equipment and personnel.
	Response: Through the contract with Kamman Hydrology & Engineering, Inc. (San Rafael, CA), detailed hydrologic and hydraulic analyses have been conducted for sections of creek where culverts have been proposed for replacement under one or more alternative, specifically Bear Valley Creek at Levee Road, Bear Valley Creek at Bear Valley Road, and Tomasini Creek at Mesa Road. A specific project need and design criterion for these structures was to increase conveyance of flood flows. Another design criterion was to minimize maintenance associated with sediment accumulation. Preliminary siting, hydraulic analyses, and modeling results indicate that the conceptual designs proposed for these crossings would achieve these objectives. During the engineering and final design phase, the agencies would continue to work closely with the County to allow the County the opportunity to further review analyses and proposed designs to ensure that it meets County flood control, maintenance, and fish passage requirements.
Document Content and Structure	
C-34	***Concern Statement (Suggestions on Improvement of Document Structure)***: Several commenters had suggestions for improving the structure of the DEIS/EIR. These suggestions included: 1) a table in Chapter 2 showing acreages restored, feet of levee removed, and other parameters; 2) more tables and figures in Chapter 4 to improve the ability of the reader to compare alternatives; 3) better graphics, including typical cross-sections, to depict what public access would look like; 4) inclusion of the Land Evaluation and Site Analysis (LESA) worksheets that were used to evaluate impacts to agricultural land use and a write-up in the Appendices.
	Response: The EIS/EIR has been modified to incorporate a table in Chapter 2 that provides a comparison of the restoration and public access changes proposed under each of the proposed alternatives. Where possible, more tables have been incorporated into Chapter 4 to help readers follow changes that could potentially occur under each of alternative. The Land Evaluation and Site Analysis (LESA) worksheets – the results of which are discussed in Chapter 4, Land Use and Planning- Agricultural Land Use – have been added to the FEIS/EIR as an appendix. Because many of the proposed public access components involve relatively minor improvements to existing facilities such as conversion of earthen trail to decomposed granite, cross-sectional figures were not considered warranted in many cases. The DEIS/EIR did provide an example cross-section for the low-elevation boardwalk proposed as part of the eastern perimeter through-trail, as well as an example graphic of prefabricated bridge as proposed for the southern perimeter through-trail. Because the possible extension of the southern perimeter through-trail to Inverness Park is considered in this document as a programmatic component and not as a project-level component, cross-sectional figures were not considered appropriate.
	Concern Statement (Suggestions on Improvement of Document Content): Several commenters had suggestions for improving the content of the document. These suggestions included:
C-35	*The DEIS/R did not adequately describe the relationship between Park Service and CalTrans with respect to this project, which is defined by a Memorandum of Understanding between the two parties. The Park Service failed to reproduce this MOU in the EIS/R.*
	Response: The relationship between the Park Service and the California Department of Transportation was discussed in Chapter 1 at a level of detail that the agencies believe is adequate to allow the public to understand the relationship and the Memorandum of Understanding. The agencies do not believe that incorporation of the MOU in the document is necessary for the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	purposes of understanding, reviewing, and commenting upon the proposed alternatives and the analysis of impacts, however, the MOU will be posted on the Seashore's web page under the Giacomini Wetland Restoration Project for those who are interested in reviewing it. Also, interested public can visit the Seashore's headquarters to review the MOU or request that the Park Service mail a copy.
C-36	*The MOU does not precisely define how much of the Giacomini Ranch would be restored to wetlands; the Park Service preferred alternative has an unacceptable bias toward ecological restoration at the expense of public access. The DEIS/R is inadequate, because it does not describe why CalTrans funds "have a link to being used to consider 'Transportation' issues on and near the subject property."*
	Response: The purpose of the agreement between the Park Service and CalTrans was to transfer obligations to mitigate impacts to aquatic habitat caused by repair of State Route 1 to the Park Service in exchange for monies for purchase and restoration of a "significant portion" of the Giacomini Ranch wetlands. In other words, the repair of State Route 1 caused impact to aquatic habitat, and CalTrans was obligated to provide off-site mitigation at another location. Because the Giacomini Ranch was located in the general vicinity of the road impact, the regulatory agencies agreed to CalTrans transferring its mitigation obligations to the Park Service in exchange for CalTrans providing monies to the Park Service for acquisition and restoration of the Giacomini Ranch. While mitigation obligations agreed to by regulatory agencies specify that only 3.6 acres of wetlands have to be restored for obligations to be fulfilled, the agreement between CalTrans and the Park Service calls for restoration of a "significant portion" of the historic marsh. Because of this, the primary purpose of the proposed project is restoration, although public access is incorporated as an objective as long as opportunities do not conflict with restoration. While CalTrans is a state of California transportation agency, there is no link between the CalTrans wetland mitigation monies and transportation issues such that the monies must be used to consider transportation issues.
C-37	*Include GFNMS as one of the political recognitions of the importance of Tomales Bay to wildlife.*
	Response: This will be incorporated into the FEIS/EIR where appropriate.
C-38	*The project background in Chapter 1 does not discuss the Park Service mission to provide opportunities for appropriate public enjoyment or the relevant Park Service Management Policies that seek to enhance natural wetland values by using them for educational, recreational, scientific, and similar purposes.*
	Response: This background information is incorporated in Chapter 1 of the DEIS/EIR under the section where the project objectives, including public access, are described.
C-39	*The DEIS/R rejects the use of the Green Bridge to be used as part of the southern perimeter trail due to the "substantial concerns" of local residents. This statement is not adequately supported in the document.*
	Response: The agencies have incorporated some additional summary information on concerns of Levee Road residents regarding routing of an access alignment on Levee Road from the two technical public access studies conducted during the planning process. This alignment was included in the preliminary public access concepts, but eliminated from the final alternatives presented and was not analyzed at a project-level in the DEIS/EIR. During the early planning process, Levee Road residents voiced substantial concerns at several meetings regarding potential impacts of this alignment on noise, traffic, and public safety. Similar concerns had apparently been voiced almost two decades earlier during public scoping efforts for the West Marin Pathways Study (Wittenkeller and Associates and Copple Foreaker & Associates 1988). The Park Service recently received a joint letter from residents along Levee Road stating they would prefer that the southern perimeter trail be routed along Levee Road rather than across Lagunitas Creek via a non-vehicular bridge.
C-40	*In Chapter 3, sharp fluctuations in salinity of Lagunitas Creek during the summer are discussed, and no strong conclusion is made as to whether these events stem from natural or unnatural causes. NMWD comments that the variation can be attributed to MMWD adjusting releases from Kent Lake to maintain the flows upstream at the Samuel P. Taylor gauge while the reported data referenced here is*

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	collected at the Gallagher gage.
	Response: This would appear to be a reasonable explanation for these fluctuations, however, because Marin Municipal Water District (MMWD) does not quantify its releases, other possible reasons for these fluctuations cannot be ruled out.
C-41	*The DEIS/R is inadequate because it does not describe that the site of the railroad grade was not wetland habitat prior to construction of the railroad.*
	Response: It is difficult to draw this conclusion because most of the information on physical and biological resources prior to construction of the railroad in the late 1800s comes from highly detailed maps prepared by U.S. Coast Survey maps that only cover low-lying intertidal areas subject to possible boat navigation. However, some of the earliest 1942 aerial photographs show riparian vegetation on the face of the Point Reyes Mesa. The presence of groundwater in the coastal marine terrace suggests that mesic vegetation such as willows have probably been present for some time, although the extent of this vegetation on the face of the Mesa could have increased since that time in response to: 1) changes in groundwater patterns and 2) berming of Tomasini Creek along the perimeter of the Mesa.
C-42	*The EIS/R does not incorporate 2005 Park Service transportation legislation.*
	Response: This information will be reviewed for applicability and, if appropriate, incorporated into the document.
	Concern Statement (Corrections of Factual Inaccuracies or Questions of Factual Accuracy in Document): Several commenters wanted to correct factual inaccuracies or questioned factual accuracy of certain statements in the document. These included:
C-43	*The Point Reyes Community Plan was published in 2001, not 2000.*
	Response: Correction incorporated.
C-44	*The zoning designation of the parcels on C Street in Point Reyes Station is incorrect in the EIS/R.*
	Response: Correction incorporated. References to "commercial residential" have been changed to "coastal residential."
C-45	*The DEIS/R noted that Value Analysis attendees included representative from GFNMS. It did not, and GFNMS would not have endorsed Alternative C as the Preferred Alternative. Please change text in ES, Chapter 1, Chapter 2, Chapter 5.*
	Response: Corrections incorporated.
C-46	*Clarify that Cordell Bank Sanctuary does not share any marine boundaries with the Park.*
	Response: Correction incorporated.
C-47	*Correct mistakes in list of agencies owning lands in the Land Use section in Chapter 4.*
	Response: Corrections incorporated.
C-48	*The DEIS/EIR states that 2 cfs of water is pumped from the Downey Well to the Giacomini Ranch for irrigation purposes. This is incorrect. The NMWD agreement commits 1.23 cfs of irrigation water to be delivered. Actual experience has shown that the amount delivered is closer to 1 cfs.*
	Response: The Giacomini family has an appropriative water right for up to 2 cfs. NMWD's contract with the Giacomini family is for only 1.23 cfs, according to NMWD.
C-49	*In Chapter 1 under Constraints, the DEIS/EIR states saltwater intrusion conditions into groundwater wells in Point Reyes Station would not exceed current levels or any increase caused would be mitigated. It is not clear that saltwater intrusion conditions would not exceed current levels under the project alternatives, nor is it clear that the Park Service will fully mitigate any increase.*
	Response: The statement in Chapter 1 reflects one of the constraints that the agencies identified as helping to guide project planning and alternative development and design process.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	The agencies believe that they have fully incorporated this constraint into project planning, design, and impact analysis, as evidenced by the considerable amount of meetings with North Marin Water District staff and computer modeling that was performed to try and determine what effect the proposed project would have on salinities in upstream portions of Lagunitas Creek. The adequacy of the analysis and the proposed mitigation measures are discussed under C-20.
C-50	*In Chapter 2, it is stated that Water Right Order No. 95-17 prohibits installation of a gravel dam. The SWRCB actually directed that the Giacominis no longer install the summer dam at its former location after 1997, but does not prohibit installation of a summer dam upstream of the Green Bridge. The Giacomini family chose not to install a dam upstream but rather to pursue an agreement with NMWD for provision of these waters.*
	Response: Clarification noted and incorporated. While a dam could be installed, it should be noted that it would need to undergo full environmental compliance process prior to installation.
C-51	*In Chapters 2 and 3, it is stated that the Giacomini family has a 0.5 cfs appropriative water right and that NMWD has a water right for 0.666 cfs on Fish Hatchery Creek. NMWD questions the accuracy of these statements.*
	Response: The Giacomini family was issued an appropriative water right license for 0.5 cfs of direct diversion between April 1 and December 1 on Fish Hatchery Creek (A021371; License No. 009730) in 1971.
C-52	*In Chapter 2, the DEIS/EIR states that the NMWD's agreement with the Giacomini family would terminate with the close of the dairy. NMWD notes that it will terminate on July 1, 2008.*
	Response: Correction incorporated.
C-53	*In Chapter 3, the DEIS/EIR notes that NMWD has a water right on Bear Valley Creek. Please clarify that NMWD holds no permanent water right on Bear Valley Creek. It secured a temporary permit in 1977 for use during that year.*
	Response: Clarification noted and incorporated.
C-54	*In Chapter 3, the DEIS/EIR states that the study commissioned by NMWD in 1997 recommended implementation of the off-tide pumping practice. NMWD comments that the 1997 study recommendations did not include institution of off-tide pumping, but rather construction of a pipeline to Gallagher Ranch well.*
	Response: Correction incorporated.
Alternatives	
C-55	Alternatives A and B do not provide adequate ecological restoration.
	Response: The Park Service's mitigation agreement with CalTrans called for restoration of a "significant" portion of the historic marsh, although, legally, the Park Service is only required to mitigate at least 3.6 acres. This language is reflected in the project purpose, which states that the purpose of the proposed project is to restore natural hydrologic and ecological processes and functions within a significant portion of the Project Area. "Significant" is not defined in the MOU with CalTrans, however, the Park Service interpreted the language as meaning a majority of the Giacomini Ranch when developing alternatives. Under Alternative A, natural hydrologic and ecological processes and functions would be restored to approximately 350 acres of the 550-acre pastures, while under Alternative B, they would be restored to all the pastures. Based on these factors, Alternatives A and B appear to meet the project purpose and provide adequate ecological restoration, although, as noted in the DEIS/EIR, neither was the preferred alternative.
	Concern Statement (*Changes to Alternatives or Preferred Alternatives*): A number of commenters submitted comments regarding changes to alternatives or changes to the preferred alternatives. Many of the changes proposed to specific restoration or public access components are discussed in separate sub-sections below. Changes proposed to the structure of alternatives and to the choice of preferred alternative are synopsized below.
C-56	*The Park Service should implement the preferred alternative, Alternative C, but without the public*

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	access components along the railroad grade.
C-57	*Alternative C should be the alternative implemented, but it should include a through-trail on the railroad grade.*
C-58	*Alternative D should be modified to eliminate the proposed spur trail extended from Railroad Point south on the railroad grade*.
	Response: The project planning team considered all comments from the public on preferences for alternatives and alternative elements, both during scoping and the DEIS/EIR review period. The agencies elected to keep the public access components on the eastern perimeter in Alternatives C and D as proposed in the DEIS/EIR with two spur trails in Alternative C and one spur trail in Alternative D. Alternatives A-D provide a balanced range of public access options on the eastern perimeter that are compatible with other restoration and public access components under each alternative.
C-59	***Concern Statement (Alternative D Should Be Preferred Alternative)***: Many commenters felt that the preferred alternative should be Alternative D.
	Response: Based on public and agency input, the agencies have shifted their preferred alternative to Alternative D, which has been modified slightly in the FEIS/EIR to reduce some of the environmental impacts associated with excavation. As discussed in Chapter 2 of the DEIS/EIR, the agencies originally selected Alternative C as the preferred alternative, even though it had identified Alternative D as the environmentally preferred alternative, because it appeared to best meet the project purpose and objectives by providing full restoration while also providing a moderate amount of public access. This combination appeared to best meet needs expressed by commenters during extensive formal and informal scoping for increased safety and connectivity between communities. However, comments from review of the DEIS/EIR appeared to be quite different during those received during scoping or early public input. Many of the comments received on the DEIS/EIR indicated were concerned that the public access components suggested under Alternatives A-C were largely incompatible with restoration and that these access components would increase traffic, noise, pollution, and change the rural character of an area already considered to be too congested by visitors on the weekend. Ultimately, the objective of incorporating public access is to provide restoration- and resource-compatible opportunities to view and enjoy the restored wetland for both able and disabled visitors and residents. Because the agencies believe that public access that is resource-compatible and that provides opportunities to view and enjoy the restored wetland for both able and disabled visitors and residents is desirable, some of the modifications to Alternative D in the FEIS/EIR also include incorporation of an ADA-compliant trail component and a programmatic component for developing a southern perimeter trail system in the future in cooperation with the County of Marin.
C-60	***Concern Statement (Alternative D Should Be Preferred Alternative, but Modified to Include Bridge)***: Many commenters felt that the preferred alternative should be Alternative D, but that it should include a bridge. At least one commenter felt that the spur trails proposed in Alternative D would be "orphan" trails that would force non-vehicular traffic onto the unsafe shoulders of Levee Road.
	Response: The goal of alternatives developed and presented in the DEIS/EIR was to present a range of public access opportunities, from the extensive public access incorporated in Alternative A to the minimal public access included in Alternative D. Ultimately, the objective of incorporating public access is to provide restoration- and resource-compatible opportunities to view and enjoy the restored wetland for both able and disabled visitors and residents. In developing alternatives, the planning team created a range of restoration and public access options, and, because Alternative D represented the most restoration, the decision was made to eliminate the bridge from at least project-level consideration, because it could have negligible to minor hydrologic impacts. Based on this perspective, the limited facilities proposed under Alternative D meet this objective of the proposed project, even if they do not provide through-trail connectivity that would allow non-vehicular traffic such as bicycles to move off road shoulders such as a non-vehicular bridge over Lagunitas Creek. The issue of whether the proposed project would adversely affect public safety is now addressed as a sub-topic in the FEIS/EIR under Visitor and Resident

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Experience – Public Access Resources.
C-61	***Concern Statement (Alternative D Not the Most Environmental Option)***: Several commenters disagreed with the project proponent's assessment that Alternative D would be the environmentally preferred alternative. They noted that extensive grading would be disruptive to wildlife and would more air quality impacts, demand for non-renewable resources, and traffic in the local community and region.
	Response: As discussed in Chapter 2 of the DEIS/EIR, these are many of the very same issues that the project planning team brought up in evaluating which of the alternatives would be the environmentally preferred one. Ultimately, the environmental advantages of excavation were considered large enough to outweigh some of the impacts. The document notes that the project planning team thought that the environmental advantages of Alternative D over Alternative C as proposed in the DEIS/EIR were relatively slight. In the FEIS/EIR, Alternative D has been modified slightly to reduce the depth of excavation in the southwestern portion of the East Pasture, which should decrease some of its environmental impacts and increase the relative advantage that it offers over Alternative C.
C-62	The Park Service should not implement any restoration alternatives, because natural processes, such as tides and annual floods, will restore the wetlands without the expense of planned restoration.
	Response: Flood-induced erosion and lack of maintenance of levees could eventually result in unplanned breaches and degradation over time of the levee system from many portions of the Giacomini Ranch. However, this process would take decades to unfold and would both delay the hydrologic and ecological benefits that restoration would provide, as well as result in most of the levee material being swept out during flood flows to Tomales Bay, which has already been declared impaired by the RWQCB for sediment. Excessive sediment decreases water quality and clarity and contributes to continued "shallowing" of the Bay, which is already considerably shallower than it was under historic conditions. Under the proposed project, most of the excavated levee material would be hauled away to a quarry for use in restoring degraded lands: some materials would be spread across the pasturelands. This would decrease short- and long-term impacts from sediment to the Bay.
C-63	The Park Service should not implement any restoration alternatives, because construction will create unsafe conditions and too much noise for local residents.
	Response: During construction, every effort would be made to continue to allow visitor access to existing trails while ensuring the safety of visitors and adjacent residents. Because current public access occurs in specific areas and the rest of the Giacomini Ranch and Olema Marsh are not subject to public or resident access, safety concerns are somewhat reduced. The issue of noise is addressed in the DEIS/EIR in Chapter 4 and elsewhere in this response to comment summary. For most residents, construction noise should not be problematic. For those immediately adjacent to certain construction areas (called sensitive construction zones), construction-related noise impacts could be major or substantial, however, agencies have proposed mitigation measures to reduce them. Please see the revised mitigation measures in Chapter 4, Air Resources – Noise and Soundscapes, of the FEIS/EIR for more detail. On balance, although impacts from construction in some cases would still be considered moderate even with mitigation, they would be temporary and offset, in general, by the major benefits to wildlife, hydrology, vegetation, viewscapes, species of special concern, and park visitors that the proposed project would provide.
Restoration Component	
C-64	***Concern Statement (Actions to Maximize Tidal Action and the Extent of Tidal Influence)***: Several commenters discussed the need to maximize tidal action and whether excavation in the southwestern corner of the East Pasture would reasonably achieve this purpose. One commenter felt that the amount of excavation in Alternative D was not excessive. Another felt that it was excessive and that even scaled back excavation in this area should only be performed if the excavation increased the potential for restoring tidal influence into Olema Marsh.
	Response: The agencies do not think that the amount of excavation proposed is excessive. As discussed in several sections of the DEIS/EIR (Chapter 1, Chapter 2, Chapter 3, Geology), elevations within the Giacomini Ranch are much higher than many other diked wetlands within the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	San Francisco Bay region. Most of the pasturelands are at or slightly above what would be called mid-marsh or intertidal elevations. Excavation of the 23 acres proposed in the DEIS/EIR under Alternative D would convert more of the pasturelands that would be exposed to tidal influence during just the higher high tides or only very infrequently to marshlands that would be exposed during average high tide conditions. It would not increase the amount of intertidal mudflat or low marsh. This restoration action would only slightly increase tidal prism within the Giacomini Ranch. As such, its effect on tidal influence in Olema Marsh would also be slight, but it would probably serve to increase salinities within the marsh, if not the volume of tidally influenced waters exchanged between the marsh and Lagunitas Creek or the areal extent of tidal influence within the marsh (G. Kamman, KHE, *pers. comm*.). Excavation of this component as proposed in the DEIS/EIR would generate approximately 60,000 CY of material. In the FEIS/EIR, this component has been modified slightly to expand the areal extent of excavation (32.5 acres), but maintain the volume of excavated material (up to ~60,000 CY), but generally decreasing the average depth of excavation.
C-65	***Concern Statement (Restoration of Olema Marsh and White House Pool County park)***: Several commenters felt that Levee Road should be replaced or reconstructed to maximize connectivity of the marsh with Lagunitas Creek and the rest of the Project Area. These commenters suggested either replacing the road with a causeway or installing more culverts than proposed. One commenting group felt that, if the high elevations of the White House Pool County park were one of the reasons that Levee Road was not going to be replaced, then the Marin County Parks and Open Space District should reconsider its decision to want to preserve existing conditions of the park, because restoration of the County park could be achieved without losing any value or use of the park. This group felt that this decision should not have been made without public input. Also, this group felt that scraping of the East Pasture of the Giacomini Ranch would have little value -- and possibly a negative impact -- on efforts to restore Olema Marsh.
	Response: In developing possible restoration scenarios for Olema Marsh, the Park Service convened an informal working group with all of the affected land agencies and organizations that included Audubon Canyon Ranch (which owns more than half of Olema Marsh), County of Marin Public Works (which owns and maintains Levee Road), and County of Marin Department of Parks and Open Space District (which leases and manages White House Pool County park). One of the first considerations in looking at options to restore Olema Marsh was existing topography. The Park Service commissioned a topographic survey of Olema Marsh to complement the survey that had already been performed in White House Pool County park and Levee Road by the U.S. Geological Survey. It was immediately evident that elevations throughout the County park were extremely high after years of fill and flood deposition and that they were high enough to invalidate the concept of a causeway without extensive excavation that would be extraordinarily costly, as well as have other environmental impacts. Similar constraints in terms of the amount of excavation, money, and environmental impacts would make restoration of the westernmost Olema Marsh culvert very difficult to implement. This culvert used to be the primary culvert prior to the 1998 flood, but large amounts of sediment deposition have essentially cut it off from the rest of the Olema Marsh and led to formation of a stand of juvenile riparian vegetation. These constraints were the primary factors driving the current restoration approach of using adaptive restoration to implement discrete actions that would or would not at some future point include replacement of the existing culverts for Bear Valley Creek at Levee and Bear Valley Roads. This approach would also help to reduce the severity of some of the negative impacts to the ecosystem that would be expected with an improvement hydrologic connectivity and the elimination of the water impoundment problem and the trend of steadily increasing water levels observed during the last decade. Shallow scraping of the East Pasture in its southern portion is intended only to remove vegetative, cover, and shallow roots of non-native grasses and herbs in a high-elevation upland area where inundation by salty water cannot be used to eliminate these species. It is not expected to have any effect on Olema Marsh.
C-66	***Concern Statement (Restoration of Tomasini Creek)***: Several commenters emphasized the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	importance of full restoration of Tomasini Creek, but some questioned the approach proposed in the project. At least one felt that the cost to benefit ratio of excavating a new channel was low when it was likely that the creek would move on its own without maintenance of the berm. Another suggested that a causeway be constructed at Mesa Road rather than replacing the culvert as proposed in Alternative D. There was also some concern on at least one commenter's part that restoring hydrologic connectivity by replacing the culvert might actually increase the amount of contaminants that are transported from upstream portions of Tomasini Creek into the restoration area: it might be better to not replace the culverts and instead maximize wetland area for contaminants that do pass through.
	Response: Under Alternative D, the alignment of Tomasini Creek is shifted into roughly what was one of its historic alignments, with the creek running through the center of the so-called Tomasini Triangle and then turning north to flow to Tomales Bay. The Tomasini Triangle is where the freshwater marsh for mitigation of impacts to the federally threatened California red-legged frog would be constructed. Therefore, the creek is aligned to run through the center of the marsh, with low vegetated berms on either side to prevent marsh waters from draining directly into the creek channel, but still allowing overflow into the marsh during high flows. However, commenters are correct that creeks such as Tomasini are dynamic systems and that it is entirely possible that the creek would migrate or jump to a new alignment on its own during a larger storm. When and if it occurs, this would be considered by the agencies to be successful restoration of natural process. Construction of the channel is only intended to give the creek a "starting point" and to foster development of the marsh during its early stages. One of the objectives for the proposed project is to improve the health of Tomales Bay. This includes acting as a filter for pollutants from upstream portions of the watershed. Currently, it is likely that some of the pollutants from the upper portions of the Tomasini Creek watershed have deposited within the somewhat artificially low gradient, depositional reach of Tomasini Creek at Mesa Road, where the undersized existing culverts have reduced hydraulic connectivity with the lower reach and encouraged a backwater effect that encourages sediment – and pollutant – deposition. While ensuring that some of the pollutants do not reach downstream portions of the watershed, this reduced connectivity has reduced other functions, including salmonid passage. Both coho and steelhead salmon have been observed recently within this creek. The appropriate facility for replacing the existing Tomasini Creek culvert would be determined during the final design for this element, which would involve further consultation with the county. It is anticipated that it could be an arched culvert, bridge, or causeway.
C-67	***Concern Statement (Creation of Additional Tidal Channels)***: At least one commenter questioned why the Lagunitas Creek pilot channel included in the central portion of the East Pasture in Alternative C was not included in Alternative D. The commenter also suggested that some additional pilot channels could be created in the southern portion of the East Pasture.
	Response: The agencies have incorporated the pilot channel that was proposed in the DEIS/EIR under Alternative C in Alternative D in the FEIS/EIR. The topography of the Giacomini Ranch, however, restricts the ability to create these channels in the southern portion of the East Pasture, because elevations are extremely high from repeated sediment deposition during flood events (and some fill activities), and these areas function more as floodplains in the current fluvial-dominated environment.
C-68	One commenting organization urged that the scope of the project be expanded and funds set aside for opportunistic replacement of culverts along Project Area perimeter to enhance biological and hydrological connectivity.
	Response: The proposed project incorporates at least three potential replacements of culverts (Levee Road, Bear Valley Road, and Mesa Road) under Alternatives C and/or D. The agencies focused on those they felt posed the most constraint to restoration of natural hydrologic and ecological processes and functions. The Park Service would be interested in working with the County of Marin Public Works should the county identify other culverts that it owns and maintains on the project perimeter for replacement.
C-69	The Park Service should remove the 1983 rip-rap along Lagunitas Creek because it was installed

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	immediately after a large flood and had the effect of unnaturally forcing the stream into an old alignment.
	Response: This action is included under Alternatives B-D of the DEIS/EIR.
C-70	What are the plans for removal or retention of Waldo's Dike?
	Response: In Chapter 2 of the DEIS/EIR, the document describes that the north levee of the West Pasture, which is also known as Waldo's Dike, would remain under the No Action Alternative and Alternative A and be removed under Alternatives B-D.
C-71	Will the tidegates on Fish Hatchery Creek be removed?
	Response: As noted above, the north levee of the West Pasture and the Fish Hatchery Creek tidegate would remain under the No Action Alternative and Alternative A and be removed under Alternatives B-D. The tidegate and flashboard dam structure on Tomasini Creek would be retained under all alternatives for at least 10- to 15 years until alternate habitat for the federally endangered tidewater goby (*Eucyclogobius newberryi*) has expanded within the restored marsh. Tomasini Creek is home to one of the largest occurrences of tidewater goby in the Project Area and Tomales Bay watershed.
C-72	The Project's first priority, and first action, should be to remove the northern levee on the West Pasture.
	Response: The agencies have put together a preliminary of restoration tasks that would be completed during the two separate years of project implementation, but, ultimately, the order in which tasks would be completed would be worked out with the construction contractor and would be based on a number of factors, including prohibitions on construction in the vicinity of clapper rail and black rail habitat during the breeding season.
C-73	The EIS/R conclusion that the restored wetlands will remove 2-18% of the pollutants entering the Project Area seems low; the Park Service should configure the wetland restoration project to maximize pollutant uptake efficiency.
	Response: While the Park Service believes that water quality improvement could be one of the most important functions that could be restored with the proposed project, the intent of the proposed project is not to create a so-called treatment wetland, but to remove impediments to natural hydrologic and ecological processes that would promote a number of hydrologic and ecological functions, including habitat and support for wildlife, habitat for rare plants, and floodwater retention and dissipation of the erosive energy of flood flows. The estimates of removal for pollutants, which have been refined in Chapter 4 of the FEIS/EIR, refer specifically to those conveyed downstream by Lagunitas Creek and its tributaries and are based on hydraulic modeling estimations of overbank flooding rates during some of the more frequent flood events. These numbers do not take into account removal of pollutants that are conveyed by other sources and that might have higher rates of retention within the Project Area. These would include Tomasini Creek, Fish Hatchery Creek, other small West Pasture drainages, stormwater run-off that flows into the Giacomini Ranch from the town of Point Reyes Station, and potentially septic-influenced groundwater inflows.
C-74	***Concern Statement (Creation of Additional Upland Refugia)***: Commenters suggested that the agencies incorporate more high tide refugia for special status species by reusing more of the excavated soils or leaving more portions of the levees as "islands."
	Response: The agencies have incorporated this idea under Alternatives B-D by extending the high tide refugia area that was created as part of a 2006 enhancement project southward. See Chapter 2 of the FEIS/EIR for additional detail. Additional refugia would continue to exist in the East Pasture at the Tomasini Triangle created freshwater marsh retention berm and on the Tomasini Creek berm, which would not be removed, but allowed to deteriorate over time.
C-75	***Concern Statement (Restoration of Additional Areas, Including Along C Street)***: The scope of restoration component should be expanded to include more lands along C Street in Point Reyes Station and along the margin of the West Pasture. Lands proposed for exchange as part of a separate

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	project should be retained (see Cumulative Effects analysis in Chapter 4), and the agencies should acquire additional lands that are either owned by the Giacomini family or potentially other private landowners. At least one commenter noted that water from small creeks that were buried as part of development of Point Reyes Station flows into the cattle corrals along C Street and that there is a potential to use this hydrology to expand the growth of willows along the Mesa perimeter. Also, one commenter requested that the agencies discuss with the County the potential of removing the Cypress trees that were planted by the County to obscure views of the loafing barn on the dairy.
	Response: The Park Service's MOU with CalTrans calls for a restoration of a significant portion of the Giacomini Ranch. However, it does not call for restoration of the entire ranch. In developing the proposed project, the planning team focused its efforts on where it felt that money available for restoration could yield the most ecological benefit. For the most part, these were areas in the low-lying pastures or former historic coastal marsh areas that are not directly adjacent to existing residential, commercial, and agricultural development and areas that have not been subject to intensive historic impacts such as repeated fill events that would require extensive excavation and rehabilitation before they could be considered "restored." For this reason, the agencies elected not to focus their restoration efforts on the dairy facility parcels along C Street in Point Reyes Station. They have been subject to repeated fill activities and disturbance from dairy activities. They are also directly adjacent to the town of Point Reyes Station, which would increase the likelihood of wildlife disturbance from people and domestic and feral animals. These were some of the reasons that the Park Service elected to enter discussions with the Giacomini family to exchange some of the higher-elevation C Street parcels for low-lying pasturelands that were considered to have more existing ecological value. This is a separate project that is discussed in the DEIS/EIR under Cumulative Impacts in Chapter 4. Until the fate of this proposed project is determined, the Park Service has no plans to remove the stand or row of Cypress trees along C Street, nor is it aware of any such plans by the county.
C-76	Restoration actions should proceed slowly for the protection of plants and animals.
	Response: For most alternatives, construction activities would be phased over two (2) seasons. Construction can occur within the pastures while levees remain but once the levees are breached or removed, the difficulty of performing construction in many areas would increase considerably and make it logistically complex, if not infeasible. Therefore, restoration activities cannot be feasibly implemented over a longer period of time. Because the agencies are restricting excavation to removal of levees, berms, manure-laden or "hot" soils, and weedy upland areas, most of the pastures would be expected to convert from non-native grass- and herb-dominated grasslands to a mosaic of native-dominated salt, brackish, and freshwater marsh slowly. As discussed in the DEIS/EIR under Chapter 4, Vegetation Resources, this transitional period in which grasses are slowly killed off by higher salinities and replaced by disturbance-adapted brackish and eventually salt marsh species could take as long as 10- to 15 years, although shifts in some systems have occurred as rapidly as 5 years.
C-77	The Park Service should quickly and thoroughly revegetate the Project Area after excavation.
	Response: Please see response to C-76 above. Restoration would not involve removal of vegetation cover except under Alternatives C and D in the southern portion of the East Pasture. Grassland vegetation would persist for a number of years as increased tidal influence slowly replaces salt-intolerant or marginally tolerant species with disturbance-adapted brackish marsh and, eventually in most areas, salt marsh species. Active revegetation is typically not considered necessary in areas where natural colonization would be expected to proceed quickly because of abundant seed and propagule sources and appropriate establishment environments and where non-native species are not expected to readily outcompete and exclude native species. For this reason, active revegetation is only planned for higher elevation and more disturbed areas where establishment environments are not conducive to natural community establishment, and non-native invasive species would be likely to outcompete native vegetation. These areas include high-elevation riparian floodplain terraces, high marsh/upland ecotone, dry upland grassland, and excavated and created areas.
C-78	In Alternative D, what is the purpose of constructing a "fence to limit cattle access" in the West Pasture if there will be no cattle grazing within the Project Area?

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Response: Under Alternative B in Chapter 2 of the DEIS/EIR, it notes that the Park Service earlier constructed a fence to limit cattle access to the 100-acre portion of the Giacomini Ranch in the West Pasture that has been owned **and managed** by the Park Service while the Reservation of Use Agreement with the Giacomini Ranch is still in effect. Under the Reservation of Use agreement, the Giacominis have continued to graze cows in the West Pasture, and this fence was built to preclude cattle from entering areas in the 100-acre portion of the pasture that had been enhanced through creation of freshwater marsh and high tide refugia. One of the actions under Alternatives B-D is to remove that fence. Under Alternative D, the Park Service proposes to construct a different fence to limit cattle access to the portion of the Point Reyes Mesa on the Martinelli Ranch that is directly northeast of the Giacomini Ranch, because this area could act as aestivation or breeding habitat for the northwestern pond turtle. The Martinelli family has a Reservation of Use agreement with the Park Service for beef cattle grazing on the Martinelli Ranch that extends through 2012.
C-79	The Park Service should remove abandoned structures and equipment within and adjacent to the Project Area.
	Response: As described in Chapter 2 under Alternatives A and B, the agencies have incorporated removal of agricultural infrastructure as one of the restoration components. Additional infrastructure adjacent to the Giacomini Hunt Lodge that could extend onto private property would also be removed and is described in Chapter 2, Actions Common to All Alternatives.
C-80	The Park Service should remove infrastructure, pipelines, and electrical wiring from the privately owned lands adjacent to the Giacomini Hunt Lodge.
	Response: This action has been incorporated as an alternative element common to all alternatives in Chapter 2 of the FEIS/EIR.
Public Access - General	
C-81	The DEIS/R is inadequate because it does not conclude that the restoration project must include installation of transportation corridors on the margins of the Project Area.
	Response: We disagree and note that relevant plans for jurisdiction on the margin of the Project Area do not require such corridors. Instead, the draft Marin Countywide Plan (Marin County Community Development Agency 2005), the Marin County Unincorporated Area Bicycle and Pedestrian Master Plan (Alta Transportation Consulting 2001), the Local Coastal Plan (Marin County Comprehensive Planning Department 1981), and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001), recommend development of additional trails and bike paths in the Point Reyes Station-Inverness area, specifically along Sir Francis Drake Boulevard and the railroad right-of-way "where feasible" (Alta Transportation Consulting 2001). The LCP notes that recreational resources should be incorporated where "consistent with the protection of natural resources and agriculture" (Marin County Comprehensive Planning Department 1981). The LCP also directs federal parks to provide access "where feasible and where consistent with the protection of the parks' natural resources" (Marin County Comprehensive Planning Department 1981). Projects should "avoid or minimize disturbance to wetlands, necessary buffer areas, and associated important wildlife habitat" (Marin County Comprehensive Planning Department 1981).
C-82	Local, state, and federal managers should consider building additional trails, such as a trail between the Green Bridge and White House Pool via Levee Road, or along the railroad grade.
	Response: Please also see response to C-39. In the DEIS/EIR, a trail along the railroad grade is considered under Alternatives A and B. A trail between the Green Bridge and White House Pool via Levee Road was originally incorporated into Alternative D, but was eliminated on the basis of public comment from the final alternative design and is referenced under Eliminated Alternatives in Chapter 2. Since then, a considerable amount of local community members appear to support a trail in this location. This alternative will not be addressed at a project-level in the FEIS/EIR, but the agencies would entertain working with the County of Marin, which owns and maintains the Green Bridge and Levee Road, to develop some type of southern perimeter trail system.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
C-83	***Concern Statement (Extension of Southern Perimeter Trail to North Levee or Inverness)***: The Project should extend the western portion of the Southern Perimeter Trail to the northern end of the Project Area and/or to Railroad Point to encourage hiking. One commenter suggested that extension of the Southern Perimeter Trail to Inverness be considered now rather than later, because construction of the trail could utilize some of the fill being created by excavation in the Giacomini Ranch.
	Response: As noted under C-82, a trail along the railroad grade to Railroad Point is considered under Alternatives A and B in the DEIS/EIR. The agencies have also proposed a programmatic component that would explore extending the southern perimeter trail to Inverness Park under Alternatives A-C. As part of some earlier public access studies, the agencies did evaluate extending the trail as far north as Drakes View Drive. However, routing of the trail near the Lucchesi/Kostelic residences poses some considerable technical challenges, because of the proximity of the road to the property boundaries and the difficulties in routing trails behind the residences because of the 1906 Drainage. This is discussed in the DEIS/EIR in Chapter 2 under Alternatives Eliminated.
C-84	The Park Service should retain at least a portion of the north levee on the West Pasture as public access.
	Response: The agencies feel that it is important to eliminate the north levee of the West Pasture for a number of reasons. First, levees that are perpendicular to the primary flow path are some of the largest impediments to hydrologic processes. Secondly, public access on the levees during extreme high and storm tides could be jeopardizing the population of state-threatened California black rails (*Laterallus jamaicensis coturniculus*) that lives in the undiked marsh north of Giacomini Ranch and that uses the levee for high tide refugia during those periods. The presence of people limits the amount of area available for rails to use and may increase their susceptibility to predation. With elimination of most of the levee, the amount of habitat for black rails and the federally endangered California clapper rails (*Rallus longirostris obsoletus*) would expand southward and increase considerably. The retention of some of the north-south trending or levees parallel to Lagunitas Creek would retain higher elevation areas necessary for refuge during high tides.
C-85	Maximize opportunities to create multi-use pathways that are not adjacent to roads.
	Response: The agencies have incorporated, where possible, pathways that are not adjacent to roads. However, efforts to incorporate restoration- and resource-compatible access opportunities are complicated by the fact that wetlands and riparian areas extend right up to the edge of roads. Under all of the action alternatives, the Park Service has retained most or all of the existing East Pasture trail (and adjacent Green Bridge County park trails), and, under Alternatives A-C, this is linked via a bridge to White House Pool County park trails. The bridge has been eliminated from project-level consideration under Alternative D in this document, because it was felt that more restoration-compatible alternatives for creating a southern perimeter trail system should be explored first. The issue of intended users is addressed below under C-89.
C-86	***Concern Statement (Overlooks in Public Access Component)***: The public access components should be focused on observation points such as viewing areas. At least one commenter felt that these observation points should be located away from residential areas.
	Response: The agencies have incorporated viewing and overlook areas at select locations along the Project Area perimeter where they believe that visitors and residents could have unique views of the restored wetland. These receive the most focus under Alternative D, because it does not offer a through-trail component in the Giacomini Ranch. Because residential areas surround the Project Area, it is impossible to locate viewing areas completely away from them, but the agencies believe that they have sited them in areas that provide the least disturbance to adjacent residents.
C-87	***Concern Statement (Educational Opportunities)***: Several commenters encouraged the agencies to expand educational opportunities through public access or interpretative displays. At least one commenter suggested that the agencies should retain one of the houses now owned by the Park

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Service in Inverness Park as an educational or interpretation facility.
	Response: The agencies are very interested in incorporating educational and interpretative opportunities through not only exhibits at viewing and overlook areas, but through programs offered through the Seashore's Interpretation Division. The house in Inverness Park has been badly damaged from years of occupancy by Giacomini Ranch workers and would require a considerable investment to allow it to be used as an educational or interpretation facility. Therefore, it is unlikely that the re-use proposed by the commenter would take place.
C-88	***Concern Statement (Width, Surfacing, and Fencing of Trails)***: Several commenters made suggestions on the types of trails or trail surfacing and fencing that should be incorporated as part of the public access component. A few commenters felt that trails should remain unimproved or be simply modest, non-vehicular trails that would appeal mainly to birdwatchers and walkers. Another felt that the trails should be surfaced with decomposed granite treated with a pine resin binder. Other commenters felt that measures should be taken to protect adjacent natural areas, either through fencing or perhaps preferably vegetative barriers that would enhance scenic views. The County of Marin requested that trails be of sufficient space and surfacing to allow all-weather access. However, one commenter requested that the County of Marin follow the Park Service lead in creating trails that are not too wide and that are environmentally sensitive.
	Response: During public access workshops, one of the most consistent comments received from members of the public regarding trails in the Project Area was that they not be paved, but be left as earthen or constructed of decomposed granite. Members of the local community felt that this would help to retain the rural character of the region. The agencies have considered a variety of surfacing approaches, including earthen, decomposed granite, decomposed granite with pine resin binder, and boardwalks. The exact surfacing to be used would be decided during final design, but no paved trails would be constructed within Park Service-owned lands. Split-rail fencing and vegetative barriers would be incorporated in certain areas to ensure that people stay on trails and out of restored areas.
C-89	***Concern Statement (Intended Trail Use)***: Several commenters discussed the need for having public access that serves a variety of users, including pedestrians, bicyclists, and equestrians. There was one request for more clarification on the intended users for the various public access facilities proposed.
	Response: The agencies intend for all trails proposed within the Project Area to be multi-use or serve a variety of users, with the exception of the West Pasture north levee trail under the No Action Alternative and Alternative, which would be restricted to hikers. This is addressed in Chapter 4, Visitor and Resident Experience – Public Access Resources, and is clarified in Chapter 2 of the FEIS/EIR under the description of the public access components.
C-90	***Concern Statement (Parking)***: Many commenters took issue with the proposal to create a small (~ 5-car) parking area in the gravel lot off Mesa Road currently used by a gardening company for equipment storage for a number of reasons, including impacts to vegetation resources, wildlife, traffic, parking, public safety, noise, and other issues (See Concern Statement: Public Access - East for more detail). At least one commenter said that Alternative C was not preferable, because it created new parking areas. The Park Service should not create a trailhead in Point Reyes Station without providing adequate parking. Another felt that creation of a new parking area was not necessary, because there was already adequate parking at the elementary school on weekends and that additional parking is being created at the ecumenical housing site. Others suggested that the proposed parking area be moved either closer to town or onto Park Service lands within the Giacomini Ranch.
	Response: The agencies do not believe that conversion of the small gravel lot currently being used by a gardening company for storage of vehicles and equipment would cause impacts to vegetation resources, wildlife habitats, or wildlife, because it is currently a disturbed area. It is also distant enough from town that it is unlikely that it would be used by visitors to town as overflow parking. Most of the people parking there would be people using the some of the Eastern Perimeter facilities proposed. Impacts from visitation on traffic and noise are addressed in Chapter 4 of the DEIS/EIR under the relevant sections – Air Resources – Noise and Soundscapes

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	and Public Services – Traffic and Transportation. Based on the analysis in the DEIS/EIR under Public Services – Traffic and Transportation/Parking, increased visitation that results from construction of public access facilities would cause no more than a minor impact in parking demand, and this minor impact would be reduced to negligible under Alternatives C and D when the Point Reyes Station trailhead is shifted from Third and C Street to the Green Bridge at State Route 1. In terms of moving the parking area, most of the Giacomini Ranch lands are either wetland or riparian area or are immediately adjacent to residences and would create potentially greater impacts.
C-91	***Concern Statement (Public Access and County Involvement)***: Several commenters felt that design, funding, and maintenance for public pathways should be undertaken jointly by the Park Service and the County of Marin. At least one commenting organization faulted the DEIS/EIR for not studying or encouraging better coordination between the Park Service, the County of Marin, and the Wildlife Conservation Board, which owns the lands that the County leases for White House Pool and Green Bridge County parks. As part of this coordination, several commenters felt that the agencies should cooperate to make signage, maintenance, and rules along the Southern Perimeter Trail generally consistent between Park Service and County-managed lands. At least one commenting organization felt that the two agencies should coordinate to make a coherent set of viewing areas so impacts to wildlife from viewing are not increased. The County of Marin commented that there was no agreement as to the division of maintenance responsibilities for trails that may exist or be built in the right-of-way and that it has not budgeted for any potential capital expenditures.
	Response: The agencies agree that certain aspects of the public access components, specifically the southern perimeter trail system, are projects that necessitate inter-agency involvement and cooperation. However, we have come to recognize that this is not the right time – or this EIS/EIR, the right vehicle – to plan for this trail system. The agencies base this conclusion on recent comments submitted by the public, which show that opinion has changed dramatically regarding the use of a bridge versus use of Levee Road, as well as on comments by submitted by public agencies that suggest that further planning and coordination efforts are needed between the Park Service and the County. Based on these comments, it would appear that the southern perimeter trail system is not "ripe for decision." Under NEPA, one of the determinants of whether an applicant has a project is whether it has an action that is "ripe for decision." When all involved agencies and the public agree that it is time to move forward on planning, the Park Service would be committed to working on expanding public access facilities on the southern perimeter of the Project Area. This cooperative project would enable better planning of viewing areas and maintenance responsibilities. (It should be noted that the current DEIS/EIR does not include any trails in County right-of-ways, although the programmatic component proposed between the Park Service and County could include a trail along Sir Francis Drake Boulevard.) One of the options that could be reevaluated under this cooperative project would siting of a trail along Levee Road to the Green Bridge, where it could connect to the enhanced Green Bridge County park trail entrance proposed under Alternatives C-D. It could also include the extension to Inverness Park discussed programmatically in the DEIS/EIR under Alternatives A-C. Because this path would be entirely within the County right-of-way, it would be appropriate for the County to take the lead. The Park Service would commit to working with the County 1) on portions where the trail enters or abuts Park Service lands and 2) on raising the necessary funding. Another option would be to construct a bridge at the location of the old summer dam as is proposed currently under Alternatives A-C. However, should any of these options be chosen, a separate environmental compliance process would be required, as this component is only addressed as a future potential project under Alternative D.
C-92	Funding for the public access components of the project should be secured simultaneously with funding for ecological restoration components of the project.
	Response: The agencies were not able to secure funds simultaneously for restoration and public access components, because public access components required additional baseline studies and public scoping efforts that delayed finalization of design relative to restoration components. In addition, many of the sources that are willing to fund restoration do not also fund public access, so the agencies have to pursue different types of federal and private funding sources.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
Public Access - ADA	
C-93	***Concern Statement (Public Access and ADA Components)***: Several commenters discussed the inclusion of accessible or ADA-compliant trails as part of the public access components. At least one commenter felt that Alternative D was not adequate, because it had failed to provide an ADA-compliant trail, and an ADA-compliant trail could be incorporated without compromising the environmental benefits of this alternative. Several commenters felt that the ADA-compliant pathway for all alternatives should be the one included in Alternatives A and B, which originated from C Street rather than being a spur trail originating from Mesa Road as proposed in Alternative C. Other commenters suggested that ADA-compliant access be provided at White House Pool County park, Olema Marsh, or Martinelli Open Space.
	Response: Topographic constraints for the trails incorporated under Alternative D had limited the agencies' ability to incorporate an ADA-compliant trail in this alternative. Strenuous objections by adjacent residents to the continued presence of a trailhead in the vicinity of 3rd and C Streets has pushed the planning team to incorporate a new Point Reyes Station trailhead at the Green Bridge and State Route 1 under Alternatives C and D, and this entrance is very steep and not suitable for ADA access. The Park Service explored other options on C Street, but they were not feasible. After subsequent discussions with County Parks and Open Space District, the Park Service has incorporated an ADA-compliant component at White House Pool County park under Alternative D in the FEIS/EIR. Further detail on this component can be found in Chapter 2 of the FEIS/EIR.
Public Access - Bridge	
C-94	***Concern Statement (A Bridge Should or Should Not be Constructed)***: Many commenters stressed the importance of incorporating a bridge across Lagunitas Creek as part of the public access component. They felt that it was a high priority and should be built as soon as possible, because it would increase public safety, allow people to enjoy the restored wetlands, and reduce vehicular traffic. One commenter suggested that the bridge be named the "Sis Arndt Memorial" Bridge. Other commenters stressed the importance of eliminating the bridge from the public access component. They felt that it was not desirable, because it would disturb wildlife by increasing human activities or would impact the existing visitor experience. Some felt that it was not worth the expense, because it would not create a through-trail. There was a concern that the bridge is too costly to build and/or maintain. Some felt that this was a reason not to build a bridge; others suggested that the agencies either build a less substantial bridge or install a seasonal bridge. Another commenter felt that the main objection to building the bridge was its cost and that the agencies should raise additional funds and thereby eliminate this objection.
	Response: As the bridge is incorporated under Alternatives A-C, both the advantages and disadvantages of the bridge are addressed in Chapter 4 under various resource topics, including Fish and Wildlife Resources, Visitor and Resident Experience – Public Access Resources and Visual Resources, Vegetation Resources, Air Resources – Noise and Soundscapes, and Public Services – Traffic and Transportation. The topic of public safety is addressed in greater detail in Public Access resources section of the FEIS/EIR than it was under the DEIS/EIR, because of the number or comments relating to public safety received during the public comment period. While the bridge would not create a complete through-trail, it would offer greater connectivity. However, because it is impossible to determine how many people would not drive because of the presence of a bridge, the environmental document does NOT assume that incorporation of a bridge would reduce traffic, although it is possible that it might. The planning team did explore lower cost and seasonal options for a bridge, but concluded that a pre-fabricated bridge was best, because it is actually less costly to design and install than a designed bridge. Based on the issues expressed in C-3, C-14, C-15, and C-22, the main objection by the public to the bridge is its impact on natural resources such as wildlife, riparian habitat, and viewscapes and other environmental issues such as traffic, air pollution, and character of the local community, not the expense. Therefore, raising additional funds is not likely to eliminate these concerns. Any naming of bridges would probably occur during the final design phase at which time suggestions would be considered.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
Public Access - Dog	
C-95	***Concern Statement (Dog Policies in Project Area and Adjacent County Parks)***: Many commenters addressed the topic of dogs and whether dogs would be permitted in the Project Area. Several felt that access for dogs -- and possibly other domesticated animals -- should not be allowed or at least limited, because dogs disturb wildlife. Even if leash policies are instituted, one commenter noted that dogs-on-leash policies are often not enforced, so owners allow dogs to run off-leash. Several other commenters felt that dog walking should be allowed within the Project Area. Some felt that dogs should be allowed to walk and run off-leash. Another commenter suggested that, to accommodate both ecological restoration and community needs, the agencies should fence off a portion of the Project Area as an off-leash dog recreation area. There was also concern from some people about how the proposed project would affect dog policies in the County parks, with people wanting to maintain the existing policy of allowing people to walk dogs in those areas.
	Response: The issue of whether dogs would be allowed on Park Service-owned lands in the Project Area is clarified in Chapter 2 of the FEIS/EIR. To summarize, dogs would not be allowed in any areas where they are not currently allowed. This would include all of the restored wetland and grassland areas that are not designated trails. It would also include the Eastern Perimeter through-trail and spur trails included under Alternatives A-C, because these areas have not been open to the public. Dogs are also currently not allowed on the Tomales Bay Trail. Under the No Action Alternative and Alternative A, dogs would not be allowed on the north levee of the West Pasture, because of the trail's proximity to habitat for federally and state listed California clapper rail (*Rallus longirostris obsoletus*; FE, SE) and California black rail (*Laterallus jamaicensis coturniculus*; ST). Because the Southern Perimeter spur trail is connected to the Green Bridge County park, which allows dogs, dog use would continue to be allowed on the Southern Perimeter through- and spur-trail components. All dogs would be required to be on a 6-foot leash at all times (36CFR 2.15 (a) 2), and owners would be subject to fines for off-leash dogs. However, if at some point in the future dogs are determined to be negatively impact wildlife, including nesting or special status wildlife species, the area could be closed to dog walking altogether through the Superintendent's Compendium process (36CFR 2.15 (a) 1). In general, dogs would continue to be allowed in County park areas subject to current and future county policies.
Public Access - East	
C-96	***Concern Statement (There Should Be No Trails or Parking Areas on Eastern Perimeter)***: Many commenters felt that no public access should be constructed on at least the southern portions of the eastern perimeter of the Project Area. Most of these comments focused on the Mesa Road spur trail and parking area, because these were the primary components included in the preferred alternative, although most applied to construction of any trail on the railroad grade. Commenters indicted that they believed that public access facilities would significantly alter the quality of life for Point Reyes Mesa residents by increasing noise, traffic congestion on Mesa Road, threats to public safety on Mesa Road, and the potential for vandalism, arson, brawls, human waste, and fire and that these factors could lead to decreases in local property values. Others felt that the facilities would degrade natural systems and wildlife habitat, including riparian habitat (See Impact Analysis section). Some commenters questioned the value of having public access facilities in this area, because there would be no through-trail (at least in Alternatives C and D), and few people would use the trail, making the costs higher than the benefits offered.
	Response: The agencies included a trail on the eastern perimeter, because considerable interest has been expressed in having public access on the historic railroad grade both prior to initiation of and during scoping for the proposed project. As with other components, the agencies attempted to create a range of actions on the eastern perimeter from a through-trail with a small parking lot and two viewing areas under Alternatives A and B to a simple spur trail and viewing area the Tomales Bay Trail under Alternative D. The agencies believe that the potential impacts of incorporating public access on the eastern perimeter of the Giacomini Ranch raised by commenters have been, for the most part, adequately addressed in the DEIS/EIR under a variety of resource topics, including Air Resources-Noise, Public Services-Traffic and Transportation, Vegetation Resources, and Fish and Wildlife Resources. Additional information regarding public

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	safety has been added to the FEIS/EIR under Visitor and Resident Experience – Public Access Resources. Construction of public access features such as trailheads would be expected to have no more than a minor adverse impact under Alternatives A and B – and negligible impacts under Alternatives C and D -- on public safety in this area relative to existing conditions. The project planning team felt that spur trails would still offer public access benefits, even if fewer people used the trail.
C-97	***Concern Statement (There Should Be Trails on Eastern Perimeter)***: In contrast to C-96, several commenters supported creation of a trail on the eastern perimeter of the Project Area. Some supported the idea that this trail could be linked in the future to other portions of the historic railroad grade, providing a much more complete public access system. Another felt that the trail should be unimproved and for foot traffic only. One commenter requested that the agencies evaluate combining a through-trail public access option with full restoration of the rest of the Project Area and indicated that the benefits of such an option were not adequately discussed in the EIS/EIR, including potential benefits to public safety of the through-trail. Also, the discussion was inadequate was because the document did not cite any authors or experts that supported creation of a trail on the railroad grade.
	Response: The agencies believe that the benefits of having a through-trail are adequately addressed in the DEIS/EIR under Visitor and Resident Experience – Public Access Resources and under Public Services – Traffic and Transportation/Alternative Transportation. As discussed under CS-96, the agencies attempted to create a range of actions on the eastern perimeter and did examine a through-trail option, as well, under Alternatives A and B. The planning team did not incorporate an eastern perimeter through-trail option with full or extensive restoration of the Giacomini Ranch and Olema Marsh under Alternatives C and D, because it was felt that this element was incompatible with full or extensive restoration. It would involve both permanent and temporary removal of riparian vegetation, would permanently impact wetlands that are subject to the jurisdiction of the U.S. Army Corps of Engineers, and would negatively affect both directly and indirectly important wildlife habitat for special status species such as the federally endangered tidewater goby (*Eucyclogobius newberryi*), the federally endangered central California coast coho salmon (*Oncorhynchus kisutch*), the federally threatened central California coastal steelhead (*Oncorhynchus mykiss*), and the state and regional federal species of special concern saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*). In addition, it could potentially violate the Streamside Conservation Act policies of the Local Coastal Plan (LCP; Marin County Comprehensive Planning Department 1981) and the Point Reyes Mesa buffer protection policies of the LCP and the Point Reyes Station Community Plan (Marin County Community Development Agency 2001). Likewise, the planning team was concerned that creating an unimproved trail would only result eventually in larger impacts to the resources through unofficial widening of the trail. Obviously, larger benefits to alternative transportation would come from a longer through-trail option that would link to other portions of the historic railroad grade. These portions of the railroad grade are outside of the scope of the Project Area and the proposed project. The Park Service has explored in the past the potential for purchasing other lands that incorporate the historic railroad grade, but were unable to reach agreement with the owners. The through-trail under Alternatives A and B was intended to serve walkers, bikers, and equestrians, although, because of the resource values in this area and the fact that it has not been previously open to dogs, dog-walking would not be allowed.
C-98	If the Park Service constructs a trail and parking area on the eastern border of the property, they should construct a sidewalk along Mesa Road to protect non-vehicular traffic.
	Response: Because of the community's interest in preserving the rural character of the local communities, the agencies have attempted to avoid creating new paved areas for trails, parking, or sidewalks. Mesa Road offers very little opportunity for creation of a sidewalk due to the presence of wetlands, riparian habitats, streams, and the proximity of private property lines and fences to the road or lack of road shoulder in many areas. One of the reasons that the agencies included a small gravel parking lot at the trailhead for the Eastern Perimeter facilities was to specifically not encourage walking along Mesa Road, which currently has very little shoulder available for placement of a formal sidewalk or even unpaved footpath. Under Alternative D, there are no public access facilities off Mesa Road under Alternative D. Under Alternative C, it is

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	unlikely that the Mesa Road spur trail would create enough foot and bike traffic between downtown Point Reyes Station and the trailhead to create a safety problem and warrant inclusion of a formal, paved sidewalk. However, under Alternatives A and B, the through-trail facilities could increase foot and bike traffic from the downtown area of Point Reyes Station. However, impacts to public safety would be considered no more than minor adverse relative to existing conditions. Should these alternatives be implemented, the Park Service may install signage at the trailhead to warn trail users that those walking along Mesa Road do so at their own risk.
C-99	***Concern Statement (Better Town Access to Martinelli Ranch)***: One commenting organization suggested that the park try to find better town access to the Martinelli Ranch by securing an access easement from one of the property owners on the south boundary and/or constructing a gate at the southeast corner.
	Response: The Park Service would be potentially interested in pursuing this in the future.
Public Access - South	
C-100	The DEIS/EIR identified a southern perimeter trail from a proposed bridge across Lagunitas Creek to White House Pool park. No specifics were provided on the exact alignment and whether the pathway is supposed to be inside or outside of the county right-of-way. Please provide details in the environmental document.
	Response: The agencies included graphics in the DEIS/EIR (Figure 7, 12, and 15) that shows the alignment of the Southern Perimeter Trail proposed under Alternatives A-C. This graphic illustrates the proposed alignment and shows that the pathway does not fall within the right-of-way for any County of Marin roads. The document also discusses a programmatic component that would potentially extend the Southern Perimeter Trail from White House Pool County park to Inverness Park in a collaborative project with the County of Marin (Figures 7, 12, and 15). This component would potentially fall within a County right-of-way for Sir Francis Drake Boulevard. Because this extension is being discussed in this document only as a possible future extension of the proposed trail, it is treated more generally or programmatically, because the decision on whether or how to proceed is not yet "ripe for decision." Specific alignments and other design details would be decided with the help of future technical study and design and additional environmental analysis and public input through a future NEPA and CEQA process.
C-101	***Concern Statement (Support for and Suggested General Modifications to Southern Perimeter Trail System)***: Several people expressed support for the Southern Perimeter Trail, stating that it would not unacceptably degrade natural resources and that the agencies should provide safe alternatives for non-vehicular traffic between Inverness Park and Point Reyes Station. Several other commenting individuals and agencies had suggested modifications to the proposed through-trail, including: 1) constructing the trail as a Class I pathway and paving it; 2) not creating a trail for weekend bicycle riders; 3) creating public access at Olema Marsh; 4) constructing a sidewalk along C Street to connect the Project Area to Highway 1; and 5) maintaining a bridge near White House Pool County park parking lot as part of the trail system.
	Response: ***1 and 2)*** During public access workshops conducted in 2005, members of the local community and general public expressed a strong preference for not creating paved paths within the Project Area. The belief was that paved paths would alter the rural character or nature of the local communities. Without paving, public access facilities would be unlikely to attract road cyclists, which is discussed in the DEIS/EIR. ***3)*** The agencies have discussed connecting the southern perimeter trail system proposed under Alternatives A-C with the Olema Marsh trail with a crosswalk across Levee Road, however, this would require further traffic analysis and consultation with and approval by the County of Marin Department of Public Works before it could be implemented. ***4)*** As noted under C-88, the agencies have attempted to minimize the amount of paved infrastructure constructed as part of the proposed project. Connection of C Street with State Route 1 would actually require sidewalks to be constructed along 3rd Street and B Street. Under Alternatives A and B, C Street would be connected to State Route 1 through the Green Bridge County park. C Street access would be eliminated under Alternatives C-D, which would negate

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	the need for a sidewalk under these alternatives. ***5)*** There would be no plans to alter or remove this bridge under any of the alternatives.
C-102	***Concern Statement (Southern Perimeter and Access from C or B Streets)***: Several commenting individuals and agencies suggested that the Southern Perimeter Trail should include access from C Street in all alternatives, not just in Alternatives A and B. Several trailhead locations were suggested, including the trailhead at 3rd Street as well as one at Fourth Street. Conversely, other commenters noted that the agencies should avoid maintaining a trailhead at 3rd Street, because it would unacceptably increase the amount of vehicle traffic and create parking problems. At least one commenter suggested that the agencies explore the potential of creating a parking lot and trailhead at the corner of B Street and Highway 1 to avoid increases in traffic and parking problems on 3rd Street.
	Response: The existing trailhead for the informal trail on the Giacomini Ranch's East Pasture levee is located at Third and C Streets. As noted under C-93, strenuous objections by adjacent residents to the continued presence of a trailhead in the vicinity of Third and C Street pushed the planning team to incorporate a new Point Reyes Station trailhead at the Green Bridge and State Route 1 under Alternatives C and D. The northernmost parcels along C Street are in private ownership (Giacomini family), and, should the land exchange move forward, most of the remaining parcels directly adjacent to C Street would also be in private ownership. The Giacominis were not interested in granting an easement to the Park Service. The Park Service has approached the trustees for the lands at the corner of B Street and State Route 1, however, there are no ongoing negotiations at the time the FEIS/EIR was prepared. The Park Service would pursue this option should the trustees express interest in the future.
C-103	***Concern Statement (Southern Perimeter Trail and Replacement of Bridge with Levee Road and Existing Green Bridge)***: Several individual and organization commenters suggested that the Southern Perimeter Trail be routed along Levee Road and the existing Green Bridge rather than constructing a new bridge at the old summer dam location. One person commented that the bridge was not necessary, because bicycling on Levee Road is safe. Others felt that access along Levee Road could be improved by either creating a bike lane in the existing road footprint or widening Levee Road, potentially on the southern side, and that widening would increase public safety. Some of the commenting organizations disagreed with statements in the DEIS/EIR that this alignment is infeasible because of concerns regarding public safety and impacts to landowners from noise and traffic, with at least one noting that this section of road would with certainty be improved at some point in the future by the County of Marin regardless of landowner concerns. Conversely, some commenters expressed concern about use of Levee Road for public access, saying that there should be no new public access along this road because it is -- and would continue to be -- too dangerous for pedestrians and bicyclists and that only the bridge trail would provide enough safety. One commenting organization stressed the need for the County of Marin and the Park Service to enter into a Memorandum of Understanding to plan, site, and fund public access facilities in this portion of the Project Area together rather than separately.
	Response: The agencies had originally considered inclusion of the Southern Perimeter Trail via Levee Road and the Green Bridge as part of Alternative D during development of its preliminary public access components. However, strong objections were voiced during the alternative and public access workshops (and reportedly during the public meetings for the West Marin Pathway study) from adjacent landowners regarding traffic and noise and from the general public regarding concerns for safety of pedestrians and bicyclists due to the speed and proximity of motor vehicles. Based on these concerns, the agencies eliminated this component from Alternative D, as is discussed in Chapter 2 of the DEIS/EIR under Alternatives Eliminated. Public opinion then changed during the comment period for the DEIS/EIR, with many local community members voicing a preference for having access along Levee Road rather than along the south bank of the East Pasture and across Lagunitas Creek. Several residents of Levee Road submitted a letter in support of having access along Levee Road. As noted in the response to C-91 above, the agencies believe that, based on the change in public opinion and the comments from local agencies, that the southern perimeter trail system is not "ripe for decision" by NEPA standards, despite years of study and meetings with agencies and the public. Further planning is apparently needed before this component can be fully implemented

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	with support from the affected public. The agencies are committed to working with the appropriate agencies on expanding public access facilities on the southern perimeter of the Project Area. This cooperative project would better enabling better planning of viewing areas and maintenance responsibilities. Based on recent public input, this trail system should first re-explore the feasibility of siting a trail along Levee Road to the Green Bridge, where it could connect to the enhanced Green Bridge County park trail entrance proposed under Alternatives C-D. It could also include the extension to Inverness Park discussed programmatically in the DEIS/EIR. Because this path would be entirely within the County right-of-way, it would be appropriate for the County to take the lead. The Park Service would commit to working with the County: 1) on portions where the trail enters or abuts Park Service lands and 2) on raising the necessary funding. Another option would be to construct a bridge at the location of the old summer dam as is proposed currently under Alternatives A-C. However, should any of these options be chosen, a new environmental document would be required, as this component is only addressed programmatically under Alternative D.
C-104	***Concern Statement (Clarification and Suggestions on Programmatic Component)***: One commenting agency requested clarification on the programmatic portion of the public access component in which the southern perimeter trail would be potentially extended to Inverness Park in the future through a collaborative project with the County of Marin. The agency requested more details on this portion, including whether or not another environmental document would be required before implementation. Another commenting agency suggested that the agencies include a fully accessible, raised viewing platform at White House Pool County park as part of the southern perimeter trail.
	Response: Under Alternatives A-C, the DEIS/EIR incorporates a programmatic component for potential future extension of the southern perimeter trail to Inverness Park through a collaborative project with the County of Marin. This component is included in this document, because it is a possible future action, however, there remain a number of factors that need to be addressed before a decision on whether or how to go forward can be made. These factors include resolving the problem of severe erosion of the creek bank adjacent to Sir Francis Drake Boulevard at White House Pool. The DEIS/EIR notes that this extension would follow one of two possible alignments – construction of a path on the road shoulder of Sir Francis Drake Boulevard all the way from White House Pool to Inverness Park or using a portion of the shoulder with the other portion being routed on a low-elevation boardwalk in the West Pasture (Figures 7, 12, and 15 in the DEIS/EIR). Included in this component is a proposal to construct an ADA-accessible viewing area in the future at White House Pool County park under Alternatives A-C. Because this element is only being addressed programmatically, there are no specific details on exact alignments, construction approaches, or conceptual cross-sections included. These details would be included in a subsequent environmental document.
C-105	***Concern Statement (Suggestions to County Parks on Maintenance and Operation)***: One commenting organization made several suggestions to the County of Marin Parks and Open Space District with regards to management of its White House Pool and Green Bridge County parks, including: 1) use the same type of trail surfacing materials as being considered by the agencies; 2) designate official trails either vegetatively or with split-rail fencing as proposed by agencies; and 3) restore remaining social trails.
	Response: The agencies cannot address comments or suggestions to other agencies.
C-106	The DEIS/EIR identifies a crosswalk along Sir Francis Drake Boulevard to connect the bridge crossing to Bear Valley Creek trail. It does not provide details on whether crosswalk is warranted nor analyzed any traffic or pedestrian hazards from such a crosswalk. Prior to construction of such a crosswalk, additional traffic and safety analysis would need to be provided to the County.
	Response: At this time, the proposed crosswalk has been removed from the document. Based on a safety analysis by DMJM/Korve, a crosswalk is not warranted, given the current number of trail users and the projected number of trail users under each of the alternatives (DMJM/Korve 2007). Should a crosswalk be considered necessary in the future, additional traffic and safety analysis would be performed and provided to the County of Marin Department of Public Works.

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
Construction	
C-107	Construction methods, traffic control, and accessibility compliance are not completely described in the document and will be required with the encroachment permit application. Provide information on proposed traffic control measures, and indicate if any lane closures are desired.
	Response: Construction methods are described in Chapter 2 of the DEIS/EIR. Additional details, including details regarding traffic delays and road closures that were discussed in other sections of the DEIS/EIR (Public Services – Traffic and Transportation), have also been incorporated into Chapter 2 of the FEIS/EIR. Traffic control measures would be developed more fully during the final design phase of the proposed project, and information on proposed traffic control, road closures, and accessibility compliance would be provided on the encroachment permit submitted to the County.
C-108	***Concern Statement (Construction Traffic and Routing)***: One commenting agency asked for clarification on whether construction would generate traffic on public roads from import or export of construction and fill materials and which streets would be used as construction routes, particularly those in Point Reyes Station. One commenter requested that all truck traffic be routed onto the ranch road near the Giacomini Hunt Lodge rather than on 3rd Street in Point Reyes Station.
	Response: As was discussed in the DEIS/EIR under Public Services – Traffic and Transportation, the proposed project would generate traffic on public roads from trailoring of construction equipment, commuting of construction personnel, and hauling of excavated sediments and other non-soil materials to disposal areas. These impacts are discussed in Chapter 4. Construction routes in Point Reyes Station, Inverness Park, and on roads to the local disposal sites for excavated sediments are discussed both in Chapter 2 and Chapter 4. During construction of the East Pasture, it is anticipated that most of the hauling would be conducted using the ranch road near the Giacomini Hunt Lodge, but construction activities near the southern bank of the East Pasture and demolition of barns would probably generate truck traffic from the access point at Third and C Streets. To minimize noise, contractors would be asked to route trucks on streets that are primarily not residential such as Fourth Street rather than Third Street.
C-109	***Concern Statement (Construction Hours and Staging Areas)***: One commenter requested that construction activities near residences start no earlier than 8 a.m. and that construction staging areas be fenced to ensure public safety.
	Response: The agencies have responded to this comment by amending the construction start time in sensitive construction zones or construction areas directly adjacent to residences to 8 a.m. in the FEIS/EIR. Most construction staging areas would not be located in areas readily accessible to the public. Efforts would also be made to locate staging areas away from residential areas. Construction and construction staging areas would be posted with signage. In certain areas (near Inverness Park, near Giacomini Hunt Lodge, and near the Giacomini Ranch dairy facility), staging areas could be fenced with construction fencing that would deter access by the public, but this fencing would not completely eliminate the ability of the public, including children, to access construction areas.
C-110	***Concern Statement (Public Notification of Construction Schedules)***: A few commenters requested that the agencies provide or publish construction schedules so that local residents can better be apprised of project progress and better anticipate impacts from construction equipment.
	Response: A preliminary construction schedule would be mailed out to all people on the mailing list for the proposed project at least two (2) to four (4) weeks prior to implementation. As with all construction projects, this schedule would be subject to change depending on scheduling of construction activities, equipment availability, constraints imposed by mitigation measures, biological and special status species constraints, and other factors. An up-to-date schedule would be maintained on the Seashore's webpage for the Giacomini Wetland Restoration Project and would be amended on an as-needed basis.
C-111	***Concern Statement (Construction and Creation of Breeding Areas for Mosquitoes)***: One commenting agency stated that impoundment of water during construction should be avoided, because it will create breeding conditions for mosquitoes. It noted that surveillance of the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	construction area might be necessary in order to address any issues that arise.
	Response: As discussed in the DEIS/EIR, construction contractors may need to install coffer dams or other water types of water control structures in order to adequately dewater construction areas. These structures could impound water. They would be installed for the minimum amount of time necessary to complete the construction task, but they could provide even temporary breeding grounds for mosquitoes. As discussed under C-17, while mosquitoes are native and elements of natural systems, the Park Service is responsible for control efforts when these organisms pose a threat of a human health hazard as determined by the U.S. Public Health Service. Because stagnant water present during the mosquito breeding seasons could provide habitat for mosquitoes, including those documented to carry West Nile virus, mitigation will include monitoring of pooled water for mosquito larvae as well as the potential use of the mosquito larvicide, *Bacillus thuringensis*(Bti), a biological pesticide which specifically targets mosquito larvae, is biodegradable and does not have measurable effects on other species.
C-112	During project construction, some existing public access trails should remain accessible and protected from construction traffic.
	Response: Some of the impacts to public access during construction would be alleviated by the fact that the restoration and public access components may not necessarily be constructed during the same years. During construction of the restoration component, only one existing public access trail would potentially be temporarily closed under Alternatives A-D – the informal existing path along the south bank of the East Pasture. The Olema Marsh trail would temporarily be closed during construction of Adaptive Restoration Component #1. Should Levee Road culverts eventually be replaced as part of the adaptive restoration of Olema Marsh, there would also be a temporary closure of the very eastern end of the White House Pool County park trail under Alternatives C-D. Under the No Action Alternative and Alternative A, the existing informal path on north levee would not be affected. When public access components are constructed, the informal path on the south bank of the East Pasture would be closed during construction of the Southern Perimeter through-trail and spur trail components. Under Alternatives C-D, the entrance to the Green Bridge County park would temporarily be closed to improve the trailhead entrance. Under Alternative D, some portion of the White House Pool County park trail system would be temporarily closed for construction of an ADA-compliant trail facility. In general, as discussed in Chapter 4 of the DEIS/EIR of Visitor and Resident Experience – Public Access Resources, impacts to existing public access during construction were characterized as no more than minor, but the effect of traffic delays and potential road closures and effects on other visitor resources in the Seashore's North District would potentially increase impacts to moderate under Alternatives C and D.
C-113	The USEPA recommends that some additional measures be included in the Spill Prevention and Response Plan, such as 1) a spill kit with boom and sorbent materials should be on site at all times during construction and 2) no vehicles will be fueled, lubricated, or otherwise serviced within 100 feet of the normal high-water area of any surface water body.
	Response: This recommendation has been incorporated into the Impact Avoidance and Mitigation Measures that would be implemented during construction for all alternatives in Chapter 2 of the FEIS/EIR.
Invasives	
C-114	The DEIS/R fails to disclose potential impacts from feral dogs and cats. The Project should mitigate adverse effects from these animals. These actions could include signage to discourage animal dumping and active trapping.
	Response: The agencies have addressed the potential impacts from feral dogs and cats in the FEIS/EIR under Fish and Wildlife Resources/Invasive Wildlife Species. To summarize, feral cats have a documented and adverse effect on birds, amphibians and small mammals in native ecosystems (Winter and Wallace 2006, Patronek 1998). Monitoring throughout the Seashore for impacts of feral cats and dogs is ongoing (N. Gates, wildlife biologist, Seashore, *pers. comm*.). However, there are no data to suggest that the Project Area will attract the release of unwanted dogs and cats any more than any other road-accessible area of the park. Release of pets on Park

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	Service lands is illegal (36CFR 2.1 (a) 2). Should illegal dumping of pets become a serious issue, signage informing the public of these regulations will be posted. Should impacts in the project area be detected, removal of feral animals will be implemented as mandated by Park Service Management Policies (Section 4.4.2.1).
C-115	***Concern Statement (Removal of Eucalyptus from Tomasini Creek and Adjacent Private Lands)***: Several commenters felt that the Park Service should support a federal/private cooperative to expedite removal of eucalyptus trees from Tomasini Creek and the surrounding privately owned portions of the Point Reyes Mesa bluff. Commenters felt that this partnership would be beneficial, because the trees could be felled across property boundaries; trees could be hauled away on existing ranch roads within the Project Area, reducing impacts to residents; and the cooperative parties could work together to control resprouting trees and implement revegetation. They note that there is support for removal of these trees in the Seashore's Exotic Management Plan, as well as the Local Coastal Plan and the Point Reyes Community Plan. They believe that removal would benefit natural hydrological and ecological processes and conditions, including conditions for the federally threatened tidewater goby, and viewsheds in the Project Area.
	Response: The Park Service agrees that there would be potential hydrologic and ecological benefits to removing the eucalyptus stands that have been planted on the Point Reyes Mesa bluff and would be interested in working cooperatively with private landowners in the future on removal of these stands as a separate project. The agencies have expanded invasive removal efforts to include the moderate number of eucalyptus trees that grow on the berm of Tomasini Creek as described in Chapter 2 of the DEIS/EIR under Actions Common to All Alternatives. Because the historic railroad grade no longer functions as a road, the feasibility of removing trees from the Giacomini Ranch-side of the Mesa is low under the No Action Alternative and Alternatives C-D and would be very difficult even with the tree clearing and eastern perimeter through-trail construction proposed under Alternatives A-B. Trees would have to be moved across Tomasini Creek to the East Pasture, and the ground surface in this area is extremely soft from long-term inundation such that it is likely that most appropriately sized trucks could become repeatedly mired in the mud. Removal of the relative few juvenile and adult eucalyptus trees growing on Tomasini Creek would be achieved by hauling out the cut-up material by foot to one of the north-south running ranch roads in this area.
Miscellaneous	
C-116	The Park Service should assume management of the California State Lands parcels immediately north of the Project Area in order to better integrate management of those lands with management of the Project Area.
	Response: This lease issue is beyond the scope of the proposed project. The Park Service is not currently pursuing a lease for these lands. However, depending on the interest of CSLC, the Park Service may be interested in pursuing a lease of these lands in the future.
C-117	***Sub-Topic (Hunting on Adjacent State Lands)***: A few commenters urged the Park Service work with other agencies to prohibit hunting on California State Lands Commission (CSLC) lands to the north of the Giacomini Ranch. One commenter suggested that the hunting area be shifted northwards towards Inverness or even as far as Walker Creek to provide a reasonable buffer.
	Response: This hunting issue is beyond the scope of the proposed project. However, in the future, the Park Service will discuss the issue with the California Department of Fish and Game (CDFG), which has management authority over this CSLC property.
C-118	The DEIS/R is inadequate because it does not provide estimated costs of the proposed alternatives and does not provide a cost/benefit analysis.
	Response: Inclusion of estimated costs and cost/benefit analysis is not a requirement of NEPA or CEQA. Reasonable alternatives" warranting detailed study are described in the President's Council on Environmental Quality (CEQ) guidance as "those that are practical or feasible from the technical and economic standpoint and using common sense." Costs and economic viability are considered along with other factors in determining the reasonableness of alternatives. However, they are not necessarily used as factors to evaluate the potential impacts of proposed projects on

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	the "human environment." Impact topics chosen for evaluation are typically ones related to the physical and natural environment, although, under CEQA, social or socioeconomic topics are often incorporated, as well, if the proposed project would have some effect on the physical environment.
C-119	***Sub-Topic (Inclusion of Land Exchange in DEIS/EIR)***: Several commenters commented upon the proposed land exchange between the Park Service and the Giacomini family. One commenter felt that the DEIS/EIR was inadequate, because it did not address the proposed property exchange. Another commenter felt that all the agriculturally zoned property in the Project Area should be in public ownership and that all infrastructure should be removed. One person questioned how the acquisition of the parcels along Sir Francis Drake Boulevard would impact Alternatives C or D.
	Response: The proposed land exchange was addressed in the DEIS/EIR as a separate project from the one proposed by the Park Service and CSLC and was listed in the table at the beginning of Chapter 4 that lists actions included in cumulative effects analysis. The project was titled Residential Home Development, C Street, even though a specific project has not been proposed, because the lands are zoned for residential development, and the reasonably foreseeable outcome of an exchange of Park Service C Street Lands for the remaining pastureland parcels still owned by the Giacominis is that homes would be developed along C Street. Inclusion of this reasonably foreseeable action in the cumulative effects analyses means that the potential impacts of each alternative (including Alternatives C and D) are considered in combination with those of the Residential Home Development for all of the impact topics addressed in the environmental document. To better clarify this in the FEIS/EIR, the proposed land exchange is now included as a separate project from Residential Home Development, C Street, and its cumulative impacts are analyzed separately from those of the reasonably foreseeable development of homes along C Street. Because of public comment, the Park Service and the Giacominis restructured the proposed land exchange agreement such that the Park Service would retain all agriculturally zoned parcels and tear down all of the buildings on Park Service lands proposed for exchange to the Giacomini family.
C-120	***Sub-Topic (Inclusion of Park Service Property in Exchange Project in Restoration Project)***: One commenter felt that the DEIS/EIR did not adequately explain why the Park Service property along C Street that is proposed for exchange for lands currently owned by the Giacomini family was excluded from the Giacomini purchase and why it was not considered integral to -- and included in -- the restoration project. This commenter felt that the Park Service should seek funding from a variety of federal and private funding sources to retain possession of the parcels west of C Street to be incorporated into the Project Area.
	Response: As discussed under C-1 and C-55, the Park Service's MOU with CalTrans calls for a restoration of a significant portion of the Giacomini Ranch. However, it does not call for restoration of the entire ranch. In the purchase and in developing the proposed project, the planning team focused its efforts on where it felt that the limited dollars available for purchase and restoration could yield the most ecological benefit. For the most part, these were areas in the low-lying pastures or former historic coastal marsh areas that are not directly adjacent to existing residential, commercial, and agricultural development and areas that have not been subject to intensive historic impacts such as repeated fill events that would require extensive excavation and rehabilitation before they could be considered "restored." For this reason, the agencies elected not to focus their restoration efforts on the dairy facility parcels along C Street in Point Reyes Station that have been subject to repeated fill activities, disturbance from dairy activities, and are directly adjacent to the town of Point Reyes Station, which would increase the likelihood of wildlife disturbance from people and domestic and feral animals. These were some of the reasons that the Park Service elected to enter discussions with the Giacomini family to exchange some of these parcels for low-lying pasturelands that were considered to have more existing ecological value as part of a separate project that is discussed in the DEIS/EIR under Cumulative Impacts in Chapter 4.
C-121	We would encourage the Park Service to continue to fund ongoing monitoring at a high level in order to track progress of the restoration actions and to allow for ongoing adaptations as needed.
	Response: The Park Service has developed a long-term monitoring program for the proposed project. As part of this monitoring project, the Park Service has been conducting pre-restoration

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES

Comment Number	Description of Concern Statement or Comment
	monitoring to establish baseline conditions and is proposing to continue monitoring after restoration is completed. Monitoring would be conducted frequently during the first 5- to 7 years post-implementation to document what is expected to be a fairly rapid evolution of the managed pasturelands into natural wetlands shaped by natural hydrologic and ecological processes and functions. Between Year 7 and Year 20, monitoring is proposed for Year 10, Year 15, and Year 20 to document changes in processes and functions that are expected to take longer to evolve. Monies have been secured to fund at least the first few years of monitoring of changes in wildlife and water quality and other variables directly or indirectly related to hydrology such as invertebrates, algae, and sediment deposition, but additional funding would be needed to fund other variables and the later years of monitoring.
C-122	Who is responsible for maintenance and law enforcement on any trails established within the Project Area?
	Response: The Park Service's Law Enforcement Division is responsible law enforcement on Park Service-owned lands within the Project Area, with backup, when needed, from the Marin County Sheriff's Office. Law enforcement on lands not owned by the Park Service would fall to the Marin County Sheriff's Office. Maintenance of trails on Park Service-owned lands would fall to the Park Service's Roads and Trails Division. Maintenance of trails that are not on Park Service-owned lands would fall either to the land owner or lessee: in the case of White House Pool and Green Bridge County parks, it would be the County of Marin Parks and Open Space District.
C-123	The Park Service should bury existing overhead utility lines between Point Reyes Station and Inverness Park.
	Response: The utility lines do not fall on Park Service lands. Most of the utility lines have been placed in the right-of-way for County of Marin roads. Burying of overhead power lines would be under the jurisdiction of the utility and the County of Marin.
C-124	Change the name of the site from "Waldo Giacomini Wetland" to "Tomales Bay Wetland."
	Response: As a condition of the purchase agreement with the Giacomini family, the Park Service agreed to name the restored wetland after Waldo Giacomini, the founder of the Giacomini Ranch dairy.
C-125	Disposal of dredged materials within PRNS may impact rare plants and introduce invasive plants. Mitigation measures should be implemented.
	Response: The Park Service is handling restoration of the quarries with imported materials as a separate project. It is listed in Chapter 4 as one of the Actions Included in the Cumulative Effects Analysis. Hauling of excavated sediments to the quarry is incorporated into this FEIS/EIR. The Seashore has prepared extensive maps showing the locations of rare plants with respect to the quarries and is in the process of refining the wetland delineations. Most of the potential impact would occur with hauling to the McClure DG quarry. The impact analysis for Vegetation Resources addresses potential impacts to wetlands and special status plant species, including proposed mitigation measures to either avoid or minimize those impacts. In terms of introducing invasive plants, the preliminary restoration plan involves disposal of imported materials at the bottom of the quarry, with grading of adjacent surface soils used to provide a "cover" or topsoil layer of sufficient depth to bury seeds and vegetative propagules of non-native invasive plant species and thereby preclude their establishment.
Permitting	
C-126	***Concern Statement (Additional Permits or Consultations That May Be Required)***: Several commenting agencies suggested that the agencies would need to seek additional permits or consultations other than those noted in the DEIS/EIR: These included: 1) consultation with Bay Area Air Quality Management District; 2) Gulf of the Farallones National Marine Sanctuary; 3) State National Pollution Discharge Elimination System (NPDES); 4) California Endangered Species Act; and 5) Lake and Streambed Alteration Agreement. The CESA would require CEQA documentation, including specified impacts, mitigation measures, and a mitigation and monitoring reporting program.
	Response: The agencies have incorporated the need for these permits or consultations into the

TABLE 103. COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD FOR GIACOMINI WETLAND RESTORATION PROJECT AND RESPONSE FROM LEAD AGENCIES	
Comment Number	Description of Concern Statement or Comment
	planning process, as is now reflected in the revised Chapter 5 of the FEIS/EIR. A mitigation and monitoring program has been developed and included as an appendix in the FEIS/EIR.
C-127	The State Department of Conservation cannot concur with a finding that a conversion of the East and West Pastures to non-agricultural uses would be less than significant unless additional clarifying detail is provided. Also, the DEIS/EIR indicates that there may be additional acquisitions that would expand the Wildlife Area in the future, but does not elaborate. Any future acquisition would require additional environmental documentation, and we ask that we receive a copy of the documents for our review and comment.
	Response: After further discussion with the State Department of Conservation officials, the agencies have incorporated a separate memorandum detailing the results of the LESA as an appendix in the FEIS/EIR. This appendix should provide the necessary information which the State Department of Conservation can use to conclude that the impacts to non-agricultural uses would be less than significant. There would be no further acquisitions as a part of the proposed project.
C-128	Does the Park Service have an estimated date for when California Coastal Commission consistency determination submittal will occur?
	Response: The Coastal Commission consistency determination submittal would occur concurrently with production of the FEIS/EIR.

Section 2

Directory of Responses to Comments

Letter Number	Organization	Comments
	Agency Correspondance	
1.	California Coastal Commission	128
2.	California Regional Water Quality Control Board	34 121 126
3.	Gulf of the Farallones National Marine Sanctuary	16 37 38 45 46 47 121 126
4.	North Marin Water District	8 20 40 48 49 50 51 52 53 54
5.	Marin/Sonoma Mosquito and Vector Control District	17 111
6.	County of Marin Department of Public Works	18 33 34 89 91 93 100 101 104 106 107 108
7.	County of Marin Department of Parks and Open Space	21 29 88 91 101 102 104
8.	State Department of Conservation	10 34 127
9.	State California Department of Fish and Game	126
10.	United States Environmental Protection Agency	11 113 126
	Organization Correspondance	
11.	California Native Plant Society	2 14 55 125
12.	Environmental Action Committee of Marin	2 4 9 15 82 94 124
13.	Marin County Bicycle Coalition; Sierra Club, Marin Chapter; Community Pathways Committee; Access 4 Bikes	5 88 89 91 92
14.	Point Reyes Lodging Association	5 89
15.	Point Reyes Village Association	14 18 22 27 43 44 64 82 93 94 96 103
16.	Sierra Club, Marin Chapter	12 15 20 21 59 64 65 66 68 91 93 96 99 103 105 117
17.	Tomales Bay Association	5 66 72 75 83 85 89 92 94 102
	Individual Correspondance	
18.	Adler-Ivanbrook, Leslie	11 12 31 32 60 77 78 88 94 95 102 109 110 112
19.	Akers, Ellery	4 23 96

Letter Number	Organization	Comments
20.	Allen, Doris	4 96 122
21.	Anderson, Sonja	60 82
22.	Barlow, Harriet	2 4 96
23.	Barry, Coelyn	2 4
24.	Barry, Kai	2 4 18
25.	Barry, Hathaway	4 14 18 93 96
26.	Barry, Hathaway, and other Point Reyes Mesa Residents	4 93 96 122
27.	Bartlett, Julia	60 96
28.	Baty, Thomas	60 94 117
29.	Beatty, Elizabeth	86
30.	Becker, Elsie	4
31.	Becker, John	2
32.	Benzinger, Lee	2 4 95
33.	Black, Winston	94
34.	Blake, Tupper	4 95
35.	Bochte, Bruce	2 4
36.	Brayton, Susan	34 95
37.	Brostrom, Margaret	4
38.	Buquen, Sharon	96
39.	Carlitz, Barbara	60
40.	Caufield, Catherine	2 27
41.	Chisholm, Graham and Cash, Kelly	79 80 155
42.	Chernin, Kim	2 4 22
43.	Clements, Kay	18 88 101
44.	Coles, Gerry	6 7 19 35 36 41 81 91 97 101 118
45.	de Laszio, Kathryn	94
46.	Deutsch, Barbara	2 14
47.	Deutch, Barry	2 8

Letter Number	Organization	Comments
48.	Dickenson, Ann	2 4
49.	Durrant, Cornelia	14 101 103
50.	Durrie, Mike	2 4
51.	Eastman, Don and Barbara	2 4
52.	Eckhart, Alice	2 14 94 96
53.	Eckhart, Chuck	66
54.	Eichstaedt, Amanda	5 42 82 83 92 97
55.	Eisenberg, Bart	2 4 14
56.	Enquist, Gayanne	4 119
57.	Evens, Jules	2 64 124
58.	Faulk, Tom	94
59.	Felix, Jeff and Bonnie	96
60.	Fleming, Randall	18 26 73 96
61.	Forester, Lynne and Phil	14 94
62.	Fox, Kenneth	72 83 87 92 94 97 102
63.	Fradkin, Phillip	61 94 117
64.	Franklin, Louise	2 4 95
65.	Freidman, Carol	5
66.	Gaman, Tom	18
67.	Gessert, Ann	2 82
68.	Gilliam, Aaron	5 10
69.	Goldfield, Joyce	60 94
70.	Gouldthorpe, John	60
71.	Greenbaum, Ann	2 123
72.	Greenlees, Gail	60 85 94 101
73.	Griffin, Anthony	2
74.	Haner, Doug	18 94
75.	Healy, Patricia	2 14

Letter Number	Organization	Comments
76.	Henderson, Susanna	95
77.	Hildreth, Bob	57 82 83
78.	Holland, Wade	60
79.	Hope, Madeline	5 110
80.	Jaffe, Louis	60 115
81.	Johnson, Rick	2 3 14 15 34 51 61 67 74 86 93 95
82.	Kaufman, Nathan	30
83.	Killion, Tom	61
84.	Kirshman, Richard	5
85.	Kriss, Jane	2 95
86.	Kutter, Rhonda	90 93 94 103
87.	Larkin, Donna	28 87 90 94 95 119
88.	Lawson, Kevin	82
89.	Leeds, Vicki	60 94
90.	Lesli, Ellen	2 14
91.	Levin, Ken	2 4 22 94
92.	Levy, Diane	2 4 60
93.	Linder, Linda	60
94.	Linvill, Michael	60
95.	Linvill, Ruth	60
96.	Livingston, Dewey	22 65 87 90 94 97
97.	Long, John	103
98.	Lopez, John	60
99.	Lopez, Ruth	60
100.	Luzzi, Lisa	4 60
101.	Masonson, Melanie	2 60
102.	Mayer, Kathleen	60 103
103.	McClaskey, Michael	27 39 87 93 94 95 114

Letter Number	Organization	Comments
104.	McEneany, Trish	83 89 123
105.	McKee, Phillip	95
106.	Melcher, Nell	60
107.	Mery, Connie	94
108.	Mery, Michael	2 64 94 102 103 116 119
109.	Mitchell, Bridger	89 115
110.	Monson, Jim	60
111.	Mooney, Sharon	2 64 94 102 103 116 119
112.	Morgan, Charlie	60
113.	Morgenstern, Marjorie	2
114.	Moser, Mary	14 122
115.	Nordbye, Terry	2 4 18 22 94 96
116.	Plant, Richard	5
117.	Prince, Susan	14 15 94
118.	Quinn, Tom and Jeri	13 15 26 69 74 75 108
119.	Reding, Chris	18
120.	Ridge, Lisa	60
121.	Ridge, Russell and Margaret	2
122.	Rodoni, Dennis and Judy	2
123.	Roe, Kenn	23
124.	Ropers, Mary	2 22 94
125.	Ross, Pamela and Gay, Charles	2 60 103
126.	Rowe, Jonathan	4 19 90 96 98
127.	Hanson, Nancy	5 70 84
128.	Sakellar, John	4 15 96
129.	Sakellar, Marianne	2 96 122
130.	Sakellar, Nancy	3 23 88
131.	Schwartz, Wendy	2

Letter Number	Organization	Comments
132.	Schweig, Rishi	60 71 89 94 96
133.	Selchie, Moreva	60 96
134.	Severitti, Marie	22 27 86 94 96 103
135.	Seymore, Susan and Graham, Lawrence	2 4
136.	Stein, Nancy	5 56 94 102 103
137.	Strauss, Emilie	2 4 14 64 94 95 114 124
138.	Strauss, George	4 60
139.	Wallof, Hunter and Willow	62 63
140.	Walters, Tanis	56 63 94 115
141.	Weisenberg, Linda	90
142.	Wheelwright, Betty	2 4 10 34 96 102 103
143.	White, Geoff and Dorothy	60
144.	Whitman, Kitty	4 60 115
145.	Whitt, Michael and Barbara	2 4 14
146.	Wilson, Maria	10 96
147.	Wright, Douglas and Hames-Wright, Lillian	1 22 24 26 75 102 119 120
148.	Anonymous 1	82
149.	Anonymous 2	60 88
150.	Anonymous 3	6 15 94
151.	Anonymous 4	6 10 18
152.	Anonymous 5	4 93

Section 3

Original Comments

Public Agency Comments

Don Neubacher

01/09/2007 09:13 AM PST

To: Lorraine Parsons/PORE/NPS@NPS, Brannon Ketcham/PORE/NPS@NPS
cc: Ann Nelson/PORE/NPS@NPS
Subject: Fw: From NPS.gov: Giacomini Wetlands Restoration Plan

FYI

Don Neubacher
Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956

415-464-5101 (office)
415-233-0303 (cell)
415-663-8132 (fax)

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

----- Forwarded by Don Neubacher/PORE/NPS on 01/09/2007 09:13 AM -----

"Larry Simon" <lsimon@coastal.ca.gov>

01/09/2007 09:04 AM PST

To: <John_A_Dell'Osso@nps.gov>
cc: <Don_neubacher@nps.gov>
Subject: RE: From NPS.gov: Giacomini Wetlands Restoration Plan

Don - That plan sounds good. Thanks for the quick reply and confirmation. We'll get comments to you by 14 Feb in order to alert you on any issues/concerns we might have on the project. Best regards,

Larry

-----Original Message-----
From: Don_Neubacher@nps.gov [mailto:Don_Neubacher@nps.gov] On Behalf Of John_A_Dell'Osso@nps.gov
Sent: Monday, January 08, 2007 4:11 PM
To: Larry Simon
Cc: Lorraine_Parsons@nps.gov; Brannon_Ketcham@nps.gov; don_neubacher@nps.gov
Subject: Re: From NPS.gov: Giacomini Wetlands Restoration Plan

Larry, depending on amount of public comments, due in to us by mid-February, we will prepared the consistency determination this spring/early summer. Based on our informal conversation during the meeting we had with you in our Regional Office, you prefer some indication
of public concerns before the Federal Consistency determination is prepared; we will include it in the Final EIS/EIR. Is this okay with you?

Don

John A Dell'Osso
Sent by: Don Neubacher

01/08/2007 04:10 PM PST

To: lsimon@coastal.ca.gov
cc: Lorraine Parsons/PORE/NPS@NPS, Brannon Ketcham/PORE/NPS@NPS, don_neubacher@nps.gov
Subject: Re: From NPS.gov: Giacomini Wetlands Restoration Plan

Larry, depending on amount of public comments, due in to us by mid-February, we will prepared the consistency determination this spring/early summer. Based on our informal conversation during the meeting we had with you in our Regional Office, you prefer some indication of public concerns before the Federal Consistency determination is prepared; we will include it in the Final EIS/EIR. Is this okay with you?

Don

lsimon@coastal.ca.gov

lsimon@coastal.ca.gov
01/08/2007 03:08 PM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetlands Restoration Plan

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

The California Coastal Commission received on December 19, 2006, a copy of the electronic version of the November 2006 Giacomini Wetlands Restoration Project DEIS/EIR. Commission staff comments on the document will be submitted to the NPS prior to the February 14, 2007, comment deadline. Comments will focus on relevant Coastal Act policies and jurisdictional issues (given the statement on Page 17 of the document that ". . . as this is a joint federal and state project, it must comply with all applicable state and local legislation on state- and county-owned lands.").

The purpose of this e-mail is to obtain confirmation from the NPS that a federal consistency determination is not contained within the Draft EIS/EIR. The Draft EIS/EIR states on Page 16 that submittal of a consistency determination to the Commission would occur "subsequent to preparation of the environmental document." Does the NPS have an estimated date for when this submittal will occur?

Sincerely,

Larry Simon Federal Consistency Coordinator California Coastal Commission 45 Fremont St., Suite 2000 San Francisco, CA 94105 (415) 904-5288 Fax: (415) 904-5400
lsimon@coastal.ca.gov www.coastal.ca.gov

lsimon@coastal.ca

.gov To:
pore_planning@nps.gov

cc:

01/08/2007 03:08 Subject: From NPS.gov:
Giacomini Wetlands Restoration Plan
PM EST

Email submitted from:
/pore/parkmgmt/planning_giacomini_wrp_ciseir_draft_2006.htm

The California Coastal Commission received on December 19, 2006, a copy of
the electronic version of the November 2006 Giacomini Wetlands Restoration
Project DEIS/EIR. Commission staff comments on the document will be submitted to the NPS prior to the February 14, 2007, comment deadline. Comments will focus on relevant Coastal Act policies and jurisdictional issues (given the statement on Page 17 of the document that ". . . as this
is a joint federal and state project, it must comply with all applicable state and local legislation on state- and county-owned lands.").

The purpose of this e-mail is to obtain confirmation from the NPS that a federal consistency determination is not contained within the Draft EIS/EIR. The Draft EIS/EIR states on Page 16 that submittal of a consistency determination to the Commission would occur "subsequent to preparation of the environmental document." Does the NPS have an estimated
date for when this submittal will occur?

Sincerely,

Larry Simon Federal Consistency Coordinator California Coastal Commission
45 Fremont St., Suite 2000 San Francisco, CA 94105 (415) 904-5288 Fax: (415) 904-5400 lsimon@coastal.ca.gov www.coastal.ca.gov

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Secretary for
Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

February 14, 2007
File No. 2158.04 (drh)

Superintendent Don Neubacher
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Giacomini Wetland Restoration Project DEIS/EIR

Dear Superintendent Neubacher:

Thank you for the opportunity to review the Draft EIS/EIR for the Giacomini Wetland Restoration Project. We believe this is an extremely valuable and important project that would restore a significant wetland ecosystem and restore natural hydrologic processes to Lagunitas Creek. Although alternative D proposes somewhat more total restoration acreage, we are willing to endorse the preferred alternative C as having high water quality and ecological value while maintaining some amenities for public access and education, which are a key part of this restoration project. This alternative would fully restore the Giacomini East and West Pastures as well as restoration of Olema Marsh. We support restoration of Olema Marsh as part of the overall project; in spite of some initial adverse impacts of increased nutrients and lowered water quality, we agree that the long-term result would be beneficial.

We would like to compliment the Park Service on doing a very thorough and well-researched job of analyzing the potential impacts of the project actions and using scientific studies to anticipate the potential impacts, as well as to define proposed mitigation actions. We are confident that the Park Service's proposed ongoing adaptive management actions can ensure a successful project.

It would be very helpful for the DEIS/EIR to include a table comparing the acreages restored, feet of levee removed, and other restoration parameters among the different proposed alternatives, as this is difficult to pull out from all of the information provided.

We would encourage the Park Service to continue to fund ongoing monitoring at a high level in order to track progress of the restoration actions and to allow for ongoing adaptations as needed. It would also be helpful to have the monitoring plan included as part of the DEIR/EIS.

In general, it should be noted that the Regional Water Quality Control Board has the following authorities relevant to the Giacomini Wetlands Restoration Project:

Water Quality Certification/WDRs: Under Clean Water Act section 404, the U.S. Army Corps of Engineers (Corps) issues permits to regulate discharges of dredged or fill material to waters of the United States. CWA section 401 allows states to deny or grant water quality certification for any activity that may result in a discharge to waters of the United States and that requires a Federal permit or license. Certification requires a finding by the Regional Board that, over the term of the permit, there is reasonable assurance that the proposed discharge will not violate water quality standards. Water quality standards include the designated beneficial uses of the receiving water, water quality criteria for those waters, and an anti-degradation policy. Certification must be consistent with the requirements of the Federal CWA, the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA), and the Regional Board's mandate to protect beneficial uses of waters of the State under Porter-Cologne. The Board may also issue Waste Discharge Requirements under its Porter-Cologne authority in conjunction with 401 Certification.

Storm Water Construction General Permit: Projects disturbing 1 or more acres of land during construction must be covered under the State National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction Activity (General Permit). This can be accomplished by filing a Notice of Intent with the State Water Resources Control Board. The project sponsor must propose and implement control measures both during and following construction that are consistent with the General Permit and with the recommendations and policies of the local agency and the Regional Board.

If you have any questions, please contact Dale Hopkins at (510) 622-2362, or via e-mail at dhopkins@waterboards.ca.gov.

Sincerely,

Wil K. Bruhns, Chief
North Bay Watershed Division

Cc: Marla Lafer, RWQCB
Andree Breaux, RWQCB

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY
Mailing: Fort Mason Bldg. 201 San Francisco, CA 94123
Phone: (415) 561-6622 FAX: (415) 561-6616

RECEIVED
Point Reyes
FEB 14 07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 12, 2007

ATTN: Don Neubacher
Giacomini Wetland Restoration Project DEIS/DEIR
Point Reyes National Seashore
1 Bear Valley Rd.
Point Reyes Station, CA 94956

RE: Draft Environmental Impact Statement/Environmental Report (DEIS/EIR) for the Giacomini Wetland Restoration Project

Dear Superintendent Neubacher:

Gulf of the Farallones National Marine Sanctuary (GFNMS) has reviewed the Draft Environmental Impact Statement/Environmental Report (DEIS/EIR) for the Giacomini Wetland Restoration Project (Proposed Project), dated November 2006. GFNMS, in coordination with other federal, state and local agencies and governments manages the waters and submerged lands of Tomales Bay to the mean high tide, including the tidal waters and submerged lands currently

All comments provided herein discuss GFNMS' analysis of the alternatives, focus on the impacts from this project to GFNMS, and examine the need for the inclusion and clarification of GFNMS jurisdiction and regulations throughout the DEIS/EIR.

The DEIS/EIR has identified Alternative C as the preferred alternative. GFNMS recognizes that Alternative C meets the Proposed Project purpose of restoring natural hydrologic processes within a significant portion of the area, and it meets the three project objectives. If Alternative C is selected as the preferred alternative for the Final EIS/EIR, the Proposed Project will result in overall positive benefits to water quality, benthic habitat and wildlife resources within Tomales Bay and the boundaries of GFNMS. This includes a positive change in sedimentation patterns in the southern portion of Tomales Bay and benefits to salmonid species by increasing access to potential habitat for feeding and shelter. GFNMS further recognizes that Park Service Management Policies aim to provide opportunities for appropriate public enjoyment and allow for educational, recreational, scientific, and similar purposes that do not disrupt wetland functions. Alternative C seems to provide several points of public access within the Proposed Project area, including the possible future construction of a trail that is compliant with the Americans with Disabilities Act.

Although Alternative C meets the proposed goal and objectives of the DEIS/EIR, GFNMS believes that Alternative D – Extensive Restoration of the Giacomini Ranch East

Printed on Recycled Paper

Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access -- will more fully meet the project purpose and main goal of restoring natural hydrological processes in several distinctive ways.

First, the southern end of the East Pasture would be excavated to bring elevations down to tidal elevations. This will result in an increased area of tidal exchange equaling almost six acres, which over the long-term could cause an increase in the potential extent of area inundated by tides, particularly in the East Pasture as stated in the analysis of Alternative D in Chapter 4. The increase in the extent of the area can result in a greater restoration opportunity for historic aquatic habitat in Tomales Bay, especially in light of the fact that sedimentation throughout Tomales Bay has increased over time causing loss of key tidal mudflat habitat. In addition, there would be excavation of even more new tidal channels in the East Pasture, and these increases in total area of tidal exchange could increase the area of aquatic edge and rearing habitat more than Alternative C.

Second, Tomasini Creek would be fully realigned into one of its historic channel alignments and the undersized culverts at Mesa Road would be replaced. These actions could result in the creation of additional passage potential beyond Alternative C for steelhead and coho salmon through Tomasini Creek; could have some additional beneficial effects on water quality in Tomasini Creek by replacing the existing culvert; and according to the analysis in Chapter 4, the realignment could eliminate potential contributions of nutrients and pathogens from the worker housing adjacent to Tomasini Creek.

revised Draft Sanctuary Management Plan for public review in October 2006. One of the five proposed issue-based action plans calls for the prevention, detection, management, and where feasible, eradication of new and established introduced species in the Sanctuary. The action plan also noted that introduced species have been identified in and around Gulf of the Farallones Sanctuary waters and have the potential to cause ecological and economic degradation to the affected coastal areas. If detection, prevention, and eradication efforts are not taken, further introduction and spread of introduced species will continue in and adjacent to the Sanctuary and potentially impact Sanctuary resources. In addition, GFNMS has proposed new regulations that would prohibit the introduction of introduced species. Alternative D is the most consistent with the proposed changes to the GFNMS Management Plan and the proposed new regulations, and would have the greatest positive impact in the removal and control of invasive species.

Forth, under Alternative D, the analysis in Chapter 4 concludes that there would be no installation or construction of infrastructure that would impede hydrologic processes. Since GFNMS regulations prohibit or otherwise regulate activities that involve constructing any structure, drilling through the seabed, and dredging or otherwise altering the seabed in any way (15 CFR, Chapter IX, Subpart H), Alternative D is most consistent with GFNMS regulations.

Finally, Alternative D is also consistent with the National Marine Sanctuaries Act (NMSA). GFNMS was designated pursuant to the NMSA, the purposes and policies of which include maintaining the natural biological communities, and protecting and where appropriate, restoring and enhancing natural habitats, populations, and ecological processes (16 U.S.C. §1431 et seq.).

Through regulation, GFNMS prohibits certain activities that are inconsistent with the goals, objectives, mandates and policies of the NMSA.

The DEIS/EIR identifies GFNMS as an agency that has been consulted with and collaborated on the Proposed Project. We believe the DEIS/EIR environmental review process should also consider and include the jurisdiction, boundaries, policies and regulations of GFNMS. GFNMS should be described in the Final EIS/EIR as one of the entities that is charged with protecting the tidal wetlands, including the tidal waters of the Proposed Project area, which, once inundated, would also be waters and submerged lands of GFNMS.

GFNMS jurisdiction, boundaries, policies and regulations must be considered in evaluation of future adaptive management options within the tidal waters of the Proposed Project area, and in the full implementation of the restoration project. Adaptive management measures must consider activities prohibited, permitted or otherwise regulated by GFNMS. These activities include discharging or depositing any material or matter, constructing structures, drilling through the seabed, dredging or altering the seabed, or removing or damaging any historical or cultural resource (15 CFR, Chapter IX, Subpart H).

Tomales Bay is a significant diverse biological community that includes subtidal channels and eelgrass beds, mudflat intertidal substrates, salt marsh and upland marsh. It is clear from the description of the affected environment in the DEIS/EIR that Tomales Bay is one of the most ecologically significant estuarine areas in the State of California, that it provides critical habitat for numerous species, and that the Project Area provides both tidal and freshwater hydrologic

The text below provides comments on specific additions and deletions to the DEIS/EIR as proposed by GFNMS. ~~Strikethrough~~ text is proposed for deletion. Text in [brackets] is proposed for addition.

Executive Summary

Introduction, Page i – Add the following sentences to the end of paragraph 4: New tidal waters within the project area will also provide the added protection as the Gulf of the Farallones National Marine Sanctuary (GFNMS). GFNMS manages the waters of Tomales Bay to the mean high tide. As the natural hydrologic processes are restored to the project area, GFNMS regulations will apply to all waters within the mean high tide.

- This information should be noted throughout the DEIS/EIR. It is important for the public to understand that any project alternative adopted other than the "No Action" alternative would result in the added protection of the mandates of the NMSA and GFNMS regulations.

Need for Action, Tomales Bay Degraded by Pollution and Other Impacts, Page v – Move the following sentences with proposed changes to the beginning of the section below titled, "Restoring Wetlands Can Improve Health of the Bay": Because of its importance to wildlife, Tomales Bay is ~~not only~~ part of the Golden Gate Biosphere Reserve, [the Gulf of the Farallones National Marine Sanctuary], and a California Critical Coastal Area. ~~but i~~[I]n [September] 2002, it was ~~nominated as~~ [designated] a "Wetland of International Importance" under an international

treaty called the Convention on Wetlands (commonly known as the Ramsar Convention). Tomales Bay is also….(Kelly 2001).

- These last sentences of this section should be changed and moved because this information is more closely related to the need for restoration to improve the health of Tomales Bay. The section before discusses pollution and other impacts, whereas the designation of Tomales Bay as important for biological reasons can be better linked to the need for restoration.

Special Status Species, Central California Coast Steelhead, Coastal California Chinook Salmon, and Central California Coast Coho Salmon, Page xxxv – Check the accuracy of the following sentences in paragraph 4: Over the short-term, restoration actions would result in negligible (3 percent; No Action Alternative) to moderate increases (31 percent; Alternatives C and D) in the amount of tidal channel perimeter or total aquatic edge available for salmonids. However, as restored marshes and created tidal channels mature, benefits to salmonids would increase over the long-term, with moderate beneficial effects expected under Alternatives A and B and major beneficial effects, under Alternatives C and D.

- The analysis of Alternative D in Chapter 4 on Page 428 states that there will be excavation of even more new tidal channels in the East Pasture. In addition, on Page 543, the analysis states that the additional tidal channel creation in the East Pasture could increase rearing habitat. Since Alternative D calls for the excavation of the Southwestern Portion of the East Pasture to tidal elevations and the excavation of even more new tidal concludes that both Alternative C and D show a 31% increase in aquatic edge habitat. However, the details of the analysis seem to be inconsistent with this conclusion in the Executive Summary. This inconsistency needs to be clarified in the Final EIS/EIR.

Consultation and Coordination, Value Analysis, Page xlvii - Change the following sentence: Value Analysis attendees included a broad range of technical experts from both within the Seashore and the GGNRA, as well as from other parks and agencies, including CSLC, [and] Marin County Department of Public Works~~, and the Gulf of the Farallones National Marine Sanctuary~~.

- In August 2005, the Park Service and CSLC held a Value Analysis process to ensure that it had developed a reasonable range of alternatives that met the screening criteria identified above and were cost-effective and to select a preliminary preferred alternative (Alternative C) for analysis in the environmental document. The Park Service Ocean Superintendent who is also the liaison to the National Marine Sanctuary program was in attendance. However, GFNMS staff were not present at this meeting and did not choose Alternative C as the preferred alternative. GFNMS staff were involved in securing some of the initial funding, and worked in coordination and consultation with Park Service staff and the Ocean Superintendent during the scoping process and the workshop. GFNMS reviewed the range of alternatives at several meetings in 2005, but staff were not involved in the selection of Alternative C as the preferred alternative. As explained above, GFNMS supports the selection of Alternative D as the preferred alternative.

CHAPTER 1. Purpose and Need for Action

Introduction, Page 1 – Change and add the following to the last sentence in paragraph 4: The Park Service and CLSL have also been working collaboratively [on the development of the range of alternatives] with the County of Marin Public Works Department and the County of Marin Parks and Open Space District, as well as the Gulf of the Farallones National Marine Sanctuary, whose jurisdiction extends into the southern portion of Tomales Bay [and whose boundary is defined by the mean high tide].

- The first addition to this sentence clarifies that GFNMS helped develop the range of alternatives, but did not provide the Park with advice on selection of the preferred alternative. The second addition clarifies the extent of GFNMS jurisdiction.

Project Purpose and Relationship to Park Service Mission and Policies, Background, Page 8-9

- The entire background section only discusses the Park's intent to preserve, conserve and restore the project area. This background is directly connected to the project purpose and the first two project objectives identified in the plan. The background does not discuss the Park Service Mission to provide opportunities for appropriate public enjoyment or the relevant Park Service Management Policies that seek to enhance natural wetland values by using them for educational, recreational, scientific, and similar purposes. Without this added information, the background seems inconsistent with the third objective to objective three which sites policies that were adopted in 2006, after project scoping and after the Value Analysis team selected an alternative. Without additional justification in the background, objective three can be interpreted as a secondary objective. If this is the case, then the selection of the preferred alternative should consider the ranking of each objective.

Legislative and Policy Guidance and Other Considerations Used in Developing Purpose and Alternatives, Other Considerations, Page 18 – Add a new section titled "Adaptive Management Considerations," and add the following text to that section: The Gulf of the Farallones National Marine Sanctuary will become an active management agency in the Giacomini Wetland Restoration Project if tidal wetlands are restored to the project area. The waters and submerged lands of the Project area would also be part of the Sanctuary. The Sanctuary shoreward boundary follows the mean high tide line of Tomales Bay and its jurisdiction overlaps with the CSLC and NPS. The Sanctuary prohibits or otherwise regulates activities related to discharging or depositing any material or matter, constructing structures, drilling through the seabed, dredging or altering the seabed, or removing or damaging any historical or cultural resource (15 CFR, Chapter IX, Subpart H).

- Although it is clear that the National Marine Sanctuary Act and GFNMS regulations were not considered "instrumental to developing the project purpose, alternative framework, and design of restoration and public access actions," this language helps the public

understand that GFNMS will have overlapping management authority with the tidal portions of the proposed project. Furthermore, additional impacts through adaptive management can come from the construction of future facilities, including construction of a bridge or pedestrian trail system. GFNMS regulations must be considered and the appropriate consultations must be made with GFNMS once the implementation process expands the tidal waters of Tomales Bay into the Proposed Project area. Consideration of all GFNMS regulations, including regulatory changes currently proposed through the GFNMS management plan review process, must be clarified in the Final EIS/EIR.

CHAPTER 2. Alternatives, Including the Preferred Alternative

The Preferred Alternative, Page 96 – Change the second sentence in the paragraph: The preferred alternative was selected during the Value Analysis process by the Value Analysis team, which was comprised of Park Service and staff from other lead or partner agencies such as the CSLC, [and] the County of Marin~~, and the Gulf of the Farallones National Marine Sanctuary~~.

- As stated in previous comments GFNMS staff were not involved in the selection of Alternative C as the preferred alternative.

CHAPTER 3. Affected Environment

~~Whichever is selected, the Park, GFNMS regulations will continue to and be applicable~~ the Proposed Project area. Based on this assumption, there are two places within this section that should include GFNMS Regulations:

1) Page 165 – Add a new section titled "Regulatory and Policy Setting" under the Soil Resources and Wetland Functionality section. This section should discuss GFNMS prohibitions and regulatory authority related to construction or alteration of the seabed.
2) Page 206 – Add current GFNMS prohibitions and regulatory authority related discharges into Sanctuary waters to the "Regulatory and Policy Setting" Section.

Project Setting, Regional and Park Context, Page 128 - Change the second sentence in the last paragraph: Adjacent to the park are areas managed by Audubon Canyon Ranch, Marin Municipal Water District, Tomales Bay and Samuel P. Taylor State Parks, and Marin County Open Space District lands. Marine boundaries are shared with the Gulf of the Farallones ~~and the Cordell Banks~~ National Marine [Sanctuary] ~~Sanctuaries~~ and Tomales Bay State Park.

- Cordell Bank Sanctuary does not share any marine boundaries with the Park.

Land Use and Planning, Park Management and Zoning, Page 132 – Add the following to the last paragraph: The boundary for the [Gulf of the] Farallones National Marine Sanctuary extends into the southern portion of Tomales Bay [and is defined as the mean high tide of Tomales Bay. The boundary of the Sanctuary will extend into the Proposed Project area if the adopted

alternative results in additional tidal exchange.]

- This addition clarifies the jurisdiction of the Sanctuary.

CHAPTER 4. Environmental Consequences

Land Use Planning, Laws Regulations, Policies and Criteria Guiding Impact Analysis, Page 340 – Add the following to the first sentence of the first paragraph: Tomales Bay and the Point Reyes region falls within a complex, multi-jurisdictional region, with lands in a variety of ownership, including private, County, local water districts, state agencies (State Land[s] Commission, ~~s~~[S]tate ~~p~~[P]arks, ~~Wildlife Conservation Board~~, CalTrans), and federal agencies such as the Park Service, [Gulf of the Farallones National Marine Sanctuary] and the U.S. Coast Guard.

- The state agencies listed in parenthesis include an entity that is not a state agency. In addition, there are several small typos related to the names of the agencies. The federal agencies list excludes GFNMS.

Fish and Wildlife Resources, Alternative D, Central California coast steelhead, coastal California Evolutionarily Significant Unit (ESU) Chinook salmon, and central California coast coho ESU salmon, Page 543 – Clarify how the last sentence in Paragraph 2 would or would not result in the same percentage of aquatic edge habitat in Giacomini Ranch in

- As stated above in the discussion of salmonid section of the Executive Summary, the analysis of Alternative C in Chapter 4 concludes on Page 533 that Alternative C shows a 31% increase in aquatic edge habitat. This conclusion is the repeated in the Executive Summary, but also states that Alternative D draws the same conclusion. However, the details of the analysis seem to be inconsistent with this conclusion. There is clearly an increase in tidal channel habitat and "rearing" habitat in Alternative D. A logical conclusion should be that the total percentage of aquatic edge habitat should also increase. If the total aquatic edge habitat does not increase, the analysis of Alternative D falls short of informing the reader why or how this is possible. This inconsistency needs to be clarified in the Final EIS/EIR.

CHAPTER 5. Consultation and Coordination

Project Planning and Scoping, Identification of Lead and Other Interested Agencies, Page 641 – Change the second sentence in the paragraph: The Gulf of the Farallones National Marine Sanctuary, whose jurisdiction includes Tomales Bay, [and whose jurisdiction will also include the tidal range on the proposed project to the mean high tide if a restoration alternative is chosen,] actively participated in the negotiations with the California Department of Transportation (CalTrans) and the California Coastal Commission (CCC) that eventually led to the agreement for CalTrans to transfer mitigation obligations to the Park Service in exchange for

providing monies for acquisition and restoration of the Giacomini Ranch.

- This addition will clarify GFNMS interest in the proposed project.

Additional Information Gathering Efforts, Value Analysis, Page 644, - Change the third sentence in the paragraph: Value Analysis attendees included a broad range of technical experts from both within the Seashore and the GGNRA, as well as from other parks and agencies, including CSLC, [and] Marin County Department of Public Works~~, and the Gulf of the Farallones National Marine Sanctuary~~.

GFNMS commends the National Park Service and California State Lands Commission in providing an adequate range of alternatives with a clear goal, and specific objectives that were developed through the public process and looks forward to working with you as an active partner when implementation of the Proposed Project begins. GFNMS appreciates this opportunity to comment on the DEIS/EIR and can provide additional information as needed for the issuance of the Final EIS/EIR. Please contact Karen Reyna at 415-561-6622 x208 if you have any questions. Thank you.

Sincerely,

Sanctuary Superintendent

cc: Superintendent Brian O'Neil

NORTH MARIN WATER DISTRICT
999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133

Point Reyes National Seashore
FEB 13 07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 7, 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Subject: Giacomini Wetlands Restoration Project DEIS/DEIR
File No. 731.9.02

Dear Mr. Neubacher:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS/DEIR) for the Giacomini Wetlands Restoration Project. The District has had an opportunity to review the DEIS/DEIR and offers the following comments:

General Comment

North Marin Water District (North Marin or NMWD) provides domestic water service to Point Reyes Station, Olema, Bear Valley, Inverness Park, Paradise Ranch Estates and Point Reyes National Seashore headquarters. All water supplied to these areas meets Safe Drinking Water Standards as regulated by California Department of Health Services and the United States Environmental Protection Agency. The community water supply is from shallow wells adjacent to Lagunitas Creek on the U.S. Coast Guard property (Coast Guard wells).

In 1995, the State Water Resources Control Board (SWRCB) issued Water Right Order No. 95-17 which determined that no water would ordinarily be available for diversion by North Marin under its then existing junior water right permits during July through October of a dry year, and directed NMWD to acquire an alternative source of water to be used during July through October of dry years. By definition, a "dry year" is one in which the total precipitation that occurs from October 1 through April 1 is less than 28" as measured at the Marin Municipal Water District Kent Lake rain gauge. In response to that order, NMWD and Giacomini and Sons, Inc. (Giacomini) entered into an agreement for raw water irrigation supply dated July 1, 1998 and amended on July 15, 2003 (Attachment 1). That agreement extends through July 1, 2008 and provides that North Marin will deliver 1.23 cubic feet per second (cfs) of flow from the North Marin Downey Well facilities to the Giacomini Ranch for pasture irrigation in exchange for transfer to NMWD of 0.67 cfs of Giacomini's then current 2.67 cfs appropriative water right under License 4324. The SWRCB approved the split of License 4324 in October 2000: issuing License 4324A to Giacomini, in the amount of 2cfs from May 1 to November 1 of each year; and issuing License 4324B to NMWD in the amount of 0.67 cfs to be diverted from May 1 to November of each year. It is NMWD's intent to rely on this senior water right license during dry year summer periods when NMWD's junior appropriative water rights may not be used pursuant to WR 95-17.

Since 1995 no dry years have occurred in the Lagunitas watershed. Historically, however, NMWD has experienced salinity intrusion into the Coast Guard wells, and since 1995, even with off-

DIRECTORS: JACK BAKER • RICK FRAITES • STEPHEN PETTERLE • DENNIS RODONI • JOHN C. SCHOONOVER
OFFICERS: CHRIS DeGABRIELE, General Manager • RENEE ROBERTS, Secretary • DAVID L. BENTLEY, Auditor-Controller • DREW McINTYRE, Chief Engineer

tide pumping which decreases the frequency of these events, NMWD has experienced salinity intrusion exceeding 100 milligrams per liter chlorides in the water supply (Attachments 2). Once introduced into the ground water used for a community water supply, the salinity is slow to dissipate, even under normal year conditions, resulting in increased disinfection by-products (DBP) concentrations. Specifically, as a result of the combination of (increased salts) with sodium hypochlorite (used for drinking water disinfection), DBP concentrations have approached maximum contaminant levels in the community water supply (Attachment 3). The DEIR/DEIS states that even though there has been considerable amount of study into the salinity intrusion problem, the exact cause or mechanism by which salinity has become elevated is still not totally understood. Additionally, the DEIR/DEIS states that average salinity during spring or high tide and normal stream flow conditions will actually increase as much as 15% in upstream portions of Lagunitas Creek under Alternatives C & D. The DEIR/DEIS is silent on the recent experience of salinity intrusion's effect on drinking water quality delivered to NMWD customers. Those effects during dry year periods, when flows in Lagunitas Creek during summer periods expect to be 25% lower than recent experience should be evaluated.

Possible mitigation measures identified under Alternatives C & D currently address only monitoring of salinity adjacent to the Coast Guard wells and collaboration and support of NMWD's pursuit of water supply reliability through development of the Gallagher Well to provide a dependable water supply to NMWD's West Marin service area. NMWD urges the National Park Service to strengthen its commitment and fund extension of a pipeline from the Point Reyes Water Treatment Plant to the Gallagher well for use during periods when the Coast Guard wells may be affected by salinity intrusion.

Detailed Comments

1. **Executive Summary, Page xl, paragraph 1:** "Located upstream of the Coast Guard wells, the Downey wells are no longer used for municipal water supply although 2 cfs water is pumped from this well during the summer to the Giacomini Ranch for irrigation purposes as part of the NMWD's agreement with the Giacomini family."

Comment: The NMWD agreement with the Giacomini family commits 1.23 cfs irrigation water delivery from the Downey well. Actual experience has shown that the irrigation pump and delivery system is inefficient and delivers on average 1 cfs to the Giacomini Ranch.

2. **Executive Summary, Page xl, paragraph 6**: "Average salinities during spring or high tide and normal streamflow conditions would actually increase by as much as 15 percent in upstream portions of Lagunitas Creek under Alternatives C-D...Because the frequency would not change, the impacts of these alternatives to municipal water supply would be moderate."

Comment: See General Comment. The DEIR/DEIS did not address drinking water quality impacts under dry year streamflow conditions and NMWD suspects that the impacts of these alternatives to municipal water supply would be more than moderate.

3. **Chapter 1, page 12:** "Constraint: Saltwater intrusion conditions into groundwater wells in Point Reyes Station would not exceed current levels or any increase caused by the proposed project would be mitigated by the project proponents."

Comment: It is not clear that saltwater intrusion conditions into the NMWD community water supply wells would not exceed current levels under the project alternatives, nor is it clear that NPS will fully mitigate any increase caused by the proposed project.

4. **Chapter 2, Alternatives, Including The Preferred Alternative, page 35, paragraph 2:** "However, historically the Giacomini family which maintains 2.0 cfs appropriative water rights on Lagunitas Creek, installed a temporary gravel dam in the creek each summer across from the White House Pool County Park to create a large freshwater pool from which irrigation waters were drawn through pumping. The Giacomini family was forced to discontinue this practice in 1997 by the SWRCB."

Comment: In Water Right Order No. 95-17, the SWRCB directed Giacomini to no longer install the summer dam at its present location after 1997, but did not prohibit installation of a summer dam upstream of the Green Bridge. The Giacomini family, in cooperation with NMWD, chose not to install the summer dam after 1997 and to rely on limited irrigation supply from the Downey Well pursuant to the agreement between NMWD and Giacomini.

5. **Chapter 2, Alternatives Including The Preferred Alternative, page 35, paragraph 2:** "The west pasture is not irrigated; however, the Giacomini family does have a 0.5 cfs appropriative water right on Fish Hatchery Creek that can be used for cattle watering and other purposes."

Comment: I am not aware of any appropriative water right on Fish Hatchery Creek.

6. **Chapter 2, Alternatives Including The Preferred Alternative, page 37, Bullet 3, Water Supply Agreement with North Marin Water District:** "This agreement would expire with the close of the dairy in 2007."

Comment: The agreement terminates on July 1, 2008.

7. **Chapter 2, Alternatives Including The Preferred Alternative, page 38, Bullet 2: Dedication of Lagunitas Creek Appropriative Water Right to In-stream Flow Uses**

Comment: Is this DEIR/DEIS intended to serve as the environmental review for the prospective in-stream flow dedication?

8. **Table 2, page 121**

Comment: Revise Alternative C. Impact, to reflect adverse change which may be more than moderate since the evaluation has not been conducted to address salinity intrusion effect on drinking water quality constituents during dry year streamflow conditions.

9. **Chapter 3, Affected Environment, page 180, Table 7, Mainstem Bear Valley Creek, Item 3, Water Diversion:** NMWD right, but no use.

Comment: NMWD holds no permanent water right on Bear Valley Creek. NMWD acquired a Temporary Permit (No. 16903, Application No. 25339) in 1977 to divert up to 0.4 cfs for municipal use and prevention of salt water intrusion during the drought year period of June 24, 1977 to November 1, 1977.

10. **Chapter 3, Affected Environment, page 184, paragraph 4:** "The Giacomini's now receive irrigation water (approximately 2 cfs during the May 1 through November 1 period) from the NMWD "Downey" well located approximated 0.9 miles upstream of Green Bridge, (Table 7)."

Comment: Irrigation deliveries from the Downey well are at maximum 1.23 cfs pursuant to the agreement between NMWD and Giacomini.

11. **Chapter 3, Affected Environment, page 186, paragraph 2:** "NMWD currently has a water right on bear Valley creek for a diversion of 0.401 cfs between January 1 and December 31, but it is

not currently used for water supply (C. DeGabriele, NMWD *pers. comm.*)."

Comment: See Comment No. 9.

12. **Chapter 3, Affected Environment, page 188, paragraph 3**: "NMWD currently has a water right for 0.666 cfs between January 1 and December 1 and the Giacomini family has a water right for 0.5 cfs between April 1 and December 1."

Comment: I'm unaware of any appropriative water right for diversion from Fish Hatchery Creek held by either NMWD or Giacomini.

13. **Chapter 3, Affected Environment, page 203, paragraph 1:** "This gauge is far enough upstream that it is not subject to tidal influence except during extreme events, (G. Kamman, KHE, *pers. comm.*). For example in 2001, stream discharge dropped from 12 cfs to 6.75 cfs within approximately 9 days followed by a sharp temporary increase from 7 cfs to ~ 9.4cfs over the period of 1 to 2 days, (Figure 29). In summer 2002, stream discharge dropped from 13 cfs to 9.5 cfs over 1 to 2 days, followed later by a sharp increase approximately 2 cfs over another 1 to 2 days (Figure 29). Whether natural or unnatural, fluctuation in freshwater inflow particularly sharp ones as shown in Figure 29, would have substantial effects on salinity patterns, both within stratified and mixed portions of the creek. (Parsons, *in prep*). Modeling results for Lagunitas Creek suggest that changes in stream discharge of 2 cfs can result in increases in doubling or 100% increases in maximum water salinities. (KHE 2006a)."

Comment: The period referred to in this paragraph and in Figure 29 reflect the change in flows maintained by Marin Municipal Water District pursuant to WR Order 95-17. From May 1 through June 15, Lagunitas Creek flows in normal years are prescribed at 12 cfs. From June 16 to November 1/15, Lagunitas Creek flows are to be maintained at 8 cfs. The variation is attributed to MMWD adjusting releases from Kent Lake to maintain the flows upstream at the park gauge while the reported data referenced here is collected at the Gallagher gauge.

14. **Chapter 3, Affected Environment, page 301, paragraph 5:** "The Downey well is no longer used for municipal water supply, although approximately 2 cfs of water is pumped from this well during the summer to the Giacomini Ranch for irrigation purposes as part of NMWD's agreement with the Giacomini family."

Comment: Correct the stated irrigation delivery to the Giacomini Ranch to 1.23 cfs.

15. **Chapter 3, Affected Environment, page 305, paragraph 5:** "Concerned about the loss of the gravel dam and the potential of the ranch to be restored to tidal wetlands, NMWD contracted with Soldati Engineering to analyze all water quality and other data collected to date to assess the potential for future salinity intrusion events and to identify ways to provide adequate, good quality water to the West Marin area given the coming changes. The NMWD study (1997) recommended implementation of off-tide pumping practices."

Comment: The 1997 Lagunitas Salinity Intrusion Study for the Point Reyes Service Area recommendations did not include implementation of off-tide pumping practices. *Rather* the report recommendations stated: "Based on the alternatives presented, it is recommended that the District construct a pipeline to the existing Gallagher well to allow immediate use of the well capacity for additional supply or for blending and pursue development of an additional redundant water supply for the Point Reyes Station area by constructing an additional water supply well (or two, if necessary) either at the Gallagher well site or on a site yet to be determined between the existing Gallagher well and the Downey well."

To date off-tide pumping practices have enabled the District customers to avoid the substantial cost burden of extending a pipeline to the Gallagher well. However, it is likely that Alternative C or D will increase the salinity intrusion to the Coast Guard wells triggering need for development of the Gallagher pipeline, and the National Parks Service should pay for same.

Sincerely,

Chris DeGabriele
General Manager

CD/rr

\\nmwdsrv1\administration\gm\west marin\giacomini wetlands neubacher letter 0107.doc

AMENDMENT
TO
AGREEMENT FOR
RAW WATER IRRIGATION SUPPLY
BETWEEN
NORTH MARIN WATER DISTRICT
AND
GIACOMINI & SONS, INC.

THAT CERTAIN "Agreement for Raw Water Irrigation Supply Between North Marin Water District and Giacomini & Sons, Inc.," dated July 1, 1998, by and between NORTH MARIN WATER DISTRICT, herein called "District," and GIACOMINI & SONS, INC., is hereby amended as follows:

Section 11 as set forth on Page 6 shall be revised and shall read as set forth on replcement Page 6A attached hereto and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have executed this amendment to their agreement on the 15th day of July, 2003.

NORTH MARIN WATER DISTRICT
"District"

Barbara B. Munden
Barbara B. Munden, President

ATTEST:

Joyce S. Arnold, Secretary

GIACOMINI & SONS, INCORPORATED

Richard Giacomini

Robert Giacomini

C:\WP51\CHRIS\LAGUNITA\Res Amendment 0603.doc

ATTACHMENT 1

July
~~June~~ 1, 1998

AGREEMENT
FOR
RAW WATER IRRIGATION SUPPLY
BETWEEN
NORTH MARIN WATER DISTRICT
AND
GIACOMINI & SONS, INC.

prevent saltwater intrusion and to divert irrigation water. The SWRCB's Order directs that after November 1, 1997, no such method of diversion of water from Lagunitas Creek can be installed downstream of the Highway 1 Bridge in Point Reyes Station as shown on Exhibit A.

(h) The SWRCB has approved a change in point of diversion for Giacomini's license including: the North Marin's Coast Guard well site, North Marin's Downey well site and a "yet to be determined point of diversion related to the report referred to in Condition 1 of the Army Corps of Engineers Permit (No. 18843N83)," commonly known as the Coast Guard site as shown on Exhibit A.

DEFINITIONS

2. Definition of terms used herein are:

(a) "annually," "per annum," or "fiscal year" mean a twelve month period commencing July 1 and ending the following June 30.

(b) "af" means acre feet, a volume of water.

(c) "cfs" means cubic feet per second, a rate of water flow.

(d) "Intertie Agreement" means Intertie Agreement between North Marin and Marin Municipal Water District dated March 11, 1993.

(e) "Point of diversion" means any location within the Lagunitas Creek watershed which is authorized by the SWRCB for removing water from the creek for the specific purpose(s) and place(s) of use designated in the authorizing permit or license.

GENERAL

3. North Marin and Giacomini both agree that the most efficient way for both parties to comply with the SWRCB Order WR 95-17 is to cooperate in construction of improvements to and operation of an irrigation diversion facility on Lagunitas Creek located upstream of the Highway 1 Bridge at the Downey well site, hereinafter called the Downey well facilities. This cooperation consists of North Marin delivering 1.23 cfs of flow from Downey well facilities to the Giacomini Ranch for pasture irrigation in exchange for transfer of 0.67 cfs of Giacomini's current 2.67 cfs appropriative water right under License 4324 to North Marin.

CONSTRUCTION

4. Subject to all permitting requirements, Downey well facilities to be improved shall include:

(a) Repair of the existing Downey well head.

(b) Removing existing pump facilities and installation of a vertical turbine pump and 30 horsepower motor mounted on the Downey well head together with electric power and controls intended to deliver an approximate flow of 550 gpm (1.23 cfs) to the Giacomini Ranch for pasture irrigation purposes.

the 2.67 cfs which may be diverted from Lagunitas Creek pursuant to License No. 4324. As soon as practicable after execution of this Agreement, Giacomini shall send a statement of change of ownership of a portion of the License to the SWRCB in accordance with 14 California Administrative Code Section 831, and Giacomini and North Marin shall simultaneously file a joint petition with the SWRCB under Water Code Section 1700 et seq. and 14 California Administrative Code Section 791 et seq. seeking the following changes: (1) change in the purpose of use, from irrigation and stock watering use to irrigation, stock watering, municipal and industrial use, for 0.67 cfs of the 2.67 cfs which may be diverted; (2) addition of North Marin's Point Reyes and Paradise Ranch service area to the place of use for 0.67 cfs of the 2.67 cfs which may be diverted; and (3) split the currently authorized diversion of 2.67 cfs pursuant to license No. 4324 into two separate licenses, allocating the diversions as follows: up to 0.67 cfs to be diverted ~~to~~ by North Marin, and up to 2.0 cfs to be diverted by Giacomini.

(b) The parties agree that once said changes are approved, they will not object if the SWRCB determines that North Marin and Giacomini should be identified as co-owners of License No. 4324, or that it will issue separate licenses covering the respective interest of North Marin and Giacomini in License No. 4324. The parties also agree that under no circumstances shall the rate of season of diversion provided for in License No. 4324 be in any way altered as a result of this transfer of a portion of the License.

(c) In the event that the SWRCB does not approve changes in License No. 4324 described as (1) or (2) in Subsection 9 (a) above, North Marin may, by written notice to Giacomini, immediately terminate this Agreement. Within thirty (30) days of receipt of such notice, Giacomini will pay to North Marin any actual initial cost advanced by North Marin pursuant to Section 10 (a) hereof, and the cost of any raw water delivered by North Marin to the Giacomini Ranch pursuant to Section 10 (c), all including interest at the rate of seven per cent (7%) from the date any such payment was made until the date of Giacomini's receipt of the notice of termination.

10. Charges, Billing and Payment.

(a) Initial costs. Pursuant to Section 6 of this Agreement North Marin shall fund all initial costs estimated to be $12,025.

(b) Ongoing Annual Costs. North Marin shall fund annual installation and maintenance of facilities at the Downey well head as necessary and the operation and maintenance costs of all diversion facilities, pump and pipeline maintenance costs and energy costs.

(c) Raw Water Charge: Raw water delivered to the Giacomini Ranch by North Marin under this Agreement shall be metered and billed at the rate established in North Marin's Regulation 54 from time to time in effect. Said rate shall be based upon North Marin's cost of operation (including electrical energy), maintenance and reserve for replacement. The current rate for raw water from Lagunitas Creek is $45.00 per acre-foot.

(d) Price for Purchase and Sale of a Portion of Water Right License No. 4324: In consideration for the sale by Giacomini to North Marin of the right to divert 0.67 cfs of the 2.67 cfs which may be diverted under License No. 4324, as described in Section 9 hereof, Giacomini shall receive raw water from North Marin pursuant to Section 8 at no cost to

NORTH MARIN WATER DISTRICT

Attest: _____
Secretary

_____
President
Board of Directors

GIACOMINI & SONS, INCORPORATED

_____
Richard Giacomini

_____
Robert Giacomini

C:\WP51\CHRIS\LAGUNITA\TRANSFER AGRMT NMWD 0598.doc

PROOF OF PUBLICATION
(2015.5 CCP)

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

Aug 12, 2004

PUBLIC HEALTH NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on Monday, August 2, 2004 and has caused sodium concentrations to increase from background levels of 30 parts per million (ppm) to a current level of 68 ppm. The United States Environmental Protection Agency has published a Drinking Water Advisory recommending sodium concentrations in drinking water between 30 and 60 ppm. Sodium concentration of 120 ppm is a health benchmark representing a 10% dietary contribution.

Additionally, chloride ion concentrations have increased from background levels of 20 ppm to a current level of 205 ppm. California Department of Health Services has set an upper aesthetic standard of 250 ppm for chlorides in drinking.

Most persons will not be affected by the higher sodium concentration but to be safe, persons with cardiac problems or kidney problems or persons on a salt-free or low-salt diet are advised to check with their doctor about drinking the water supply.

Actions the District have taken to correct the problem are:

1) Continue off-tide pumping practice at the Pt. Reyes wells.

2) Continue sampling and monitoring of the sodium levels. Additional public notices will be issued should the sodium levels remain above 50 ppm.

3) Should sodium levels continue to exceed 60 ppm, steps will be undertaken to install a salinity intrusion barrier upstream of the State Route Highway 1 Bridge crossing Lagunitas Creek at Point Reyes Station, California.

We trust the salt levels will return to normal but the time this will take is unknown. In the meantime we will run weekly notices in the Point Reyes Light containing current sodium and chloride ion concentrations.

Thank you for your forbearance with this problem.

Chris DeGabriele,
General Manager
North Marin Water District

Published in The Point Reyes Light, Aug. 12, ~~19, 26, Sept 2~~, 2004.

RNP

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 12TH day of August, 2004.

Signature

ATTACHMENT 2

PROOF OF PUBLICATION
(2015.5 CCP)

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin. State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

NOTICE

Sodium and chloride ion concentrations in the West Marin Water Supply:

Date	Sodium	Chloride	
Week of 8/02/04	69	209	mg/l*
Week of 8/16/04	58	122	mg/l*
Week of 8/16/04	50	105	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, August 19, 2004.

Aug 19, 2004

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 19th day of August, 2004.

Rosalie H Patterson
Signature

last week

NOTICE

Sodium and chloride ion concentrations in the West Marin Water Supply:

Date	Sodium	Chloride	
Week of 8/02/04	69 8/6	209	mg/l*
Week of 8/9/04	58	122	mg/l*
Week of 8/16/04	50	105	mg/l*

should have been

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

don't count

PROOF OF PUBLICATION

PROOF OF PUBLICATION
(2015.5 CCP)

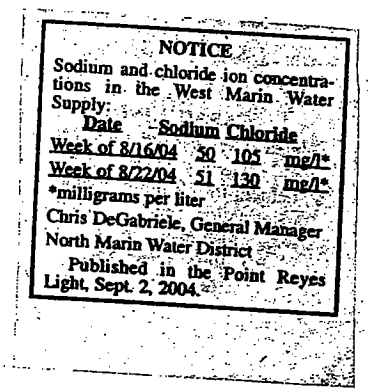
RECEIVED
SEP 07 2004
NORTH MARIN WATER DISTRICT

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:



NOTICE

Sodium and chloride ion concentrations in the West Marin Water Supply:

Date	Sodium	Chloride	
Week of 8/16/04	50	105	mg/l*
Week of 8/22/04	51	130	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, Sept. 2, 2004.

Sept 2, 2004

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 2nd day of September, 2004.

Rosalie N Patterson
Signature

PROOF OF PUBLICATION

PROOF OF PUBLICATION
(2015.5 CCP)

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on August 2, 2004 and has caused sodium levels to increase from background levels of 30 parts per million (ppm) to a current level of 62 ppm. The table below lists most recent concentrations for sodium and chloride in the West Marin water supply::

Date	Sodium	Chloride	
Week of 9/6/04	74	199	mg/l*
Week of 9/13/04	62	174	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, Sept.16, 2004.

Sept 16, 2004

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 16th day of September, 2004.

Rosalie V Tatteson
Signature

RECEIVED

SEP 21 2004

NORTH MARIN WATER DISTRICT

PROOF OF PUBLICATION

PROOF OF PUBLICATION
(2015.5 CCP)

RECEIVED
SEP 27 2004
NORTH MARIN WATER DISTRICT

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on August 2, 2004 and has caused sodium levels to increase from background levels of 30 parts per million (ppm) to a current level of 62 pp. The table below lists most recent concentrations for sodium and chloride in the West Marin water supply:

Date	Sodium	Chloride	
Week of 9/13/04	62	174	mg/l*
Week of 9/20/04	62	162	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, Sept.23, 2004.

Sept 23, 2004

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 23rd day of September, 2004.

Rosalie N Fallon
Signature

NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on August 2, 2004 and has caused sodium levels to increase from background levels of 30 parts per million (ppm) to a current level of 62 pp. The table below lists most recent concentrations for sodium and chloride in the West Marin water supply:

Date	Sodium	Chloride	
Week of 9/20/04	62	162	mg/l*
Week of 9/27/04	61	147	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, Sept 30, 2004

PROOF OF PUBLICATION

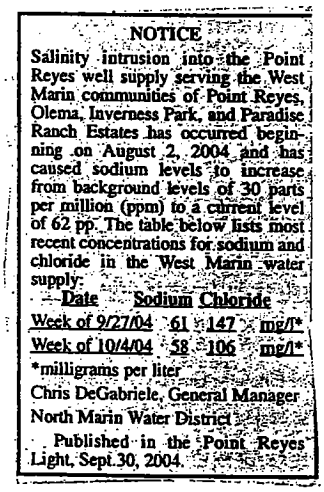
PROOF OF PUBLICATION
(2015.5 CCP)

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:



NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on August 2, 2004 and has caused sodium levels to increase from background levels of 30 parts per million (ppm) to a current level of 62 pp. The table below lists most recent concentrations for sodium and chloride in the West Marin water supply:

Date	Sodium	Chloride	
Week of 9/27/04	61	147	mg/l*
Week of 10/4/04	58	106	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, Sept. 30, 2004

Oct 7, 2004

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 7th day of October, 2004.

RECEIVED
OCT 11 2004
NORTH MARIN WATER DISTRICT

Rosalie N Patterson
Signature

PROOF OF PUBLICATION

PROOF OF PUBLICATION
(2015.5 CCP)

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on August 2, 2004 and has caused sodium levels to increase from background levels of 30 parts per million (ppm) to a current level of 62 pp. The table below lists most recent concentrations for sodium and chloride in the West Marin water supply:

Date	Sodium	Chloride	
Week of 10/4/04	58	106	mg/l*
Week of 10/11/04	53	107	mg/l*

*milligrams per liter

Chris DeGabriele, General Manager
North Marin Water District

Published in the Point Reyes Light, Oct. 14, 2004.

Oct 14, 2004

RECEIVED

OCT 19 2004

NORTH MARIN WATER DISTRICT

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 14th day of October, 2004.

Rosalie K Patterson
Signature

PROOF OF PUBLICATION
(2015.5 CCP)

This space is for the County's Clerk Filing Stamp:

STATE OF CALIFORNIA
County of Marin

Proof of Publication

I am a citizen of the United State and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the in the above-entitled matter. I am the publisher of The Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reyes Station, county of Marin and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under the date of April 26, 1949, Case Number 18307; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

Nov 10, 2004

PUBLIC NOTICES

PUBLIC HEALTH NOTICE

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred beginning on Wednesday, October 27, 2004 and has caused sodium concentrations to increase from recent levels of below 50 parts per million (ppm) to a current level of 63 ppm. The United States Environmental Protection Agency has published a Drinking Water Advisory recommending sodium concentrations in drinking water between 30 and 60 ppm. Sodium concentration of 120 ppm is a health benchmark representing a 10% dietary contribution.

Additionally, chloride ion concentrations have increased from background levels of 20 ppm to a current level of 76 ppm. California Department of Health Services has set an upper aesthetic standard of 500 ppm for chlorides in drinking water.

Most persons will not be affected by the higher sodium concentration but to be safe, persons with cardiac problems or kidney problems or persons on a salt-free or low-salt diet are advised to check with their doctor about drinking the water supply.

Actions the District have taken to correct the problem are:

1) Continue off-tide pumping practice at the Pt. Reyes wells.
2) Continue sampling and monitoring of the sodium levels. Additional public notices will be issued should the sodium levels remain above 50 ppm.
3) Should sodium levels continue to exceed 60 ppm, steps will be undertaken to install a salinity intrusion barrier upstream of the State Route Highway 1 Bridge crossing Lagunitas Creek at Point Reyes Station, California.

We trust the salt levels will return to normal but the time this will take is unknown. In the meantime we will run weekly notices in the Point Reyes Light containing current sodium and chloride ion concentrations.

Thank you for your forbearance with this problem.

Chris DeGabriele
General Manager
North Marin Water District

Published in The Point Reyes Light, Nov. 10, 2004.

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Pt. Reyes Station, California, this 10th day of November, 2004.

Rosalie K Patterson
Signature

RECEIVED
NOV 17 2004
NORTH MARIN WATER DISTRICT

State of California
Drinking Water Program

Department of Health Services

Quarterly TTHM Report for Disinfection Byproducts Compliance (in µg/L or ppb)

System Name: Point Reyes System No.: 2110006 Year: 2006 Quarter: 3rd

Year:	2002				2003				2004				2005				2006			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):										5/4	8/10			5/10	8/9			5/9	8/8	
Site 1										20.0	35.0			33.0	27.0			32.0	14.0	
Site 2										34.0	81.0			44.0	45.0			43.0	56.0	
Site 3																				
Site 4																				
Site 5																				
Site 6																				
Site 7																				
Site 8																				
Site 9																				
Site 10																				
Site 11																				
Site 12																				
Quarterly Average										27.0	58.0			38.5	36.0			37.5	35.0	
Running Annual Average																				
Meets Standard?* (check box)	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☐ No ☐
Number of Samples Taken										2	2			2	2			2	2	

Identify the sample locations in the table below.

Site	Sample Location
1	Red Barn
2	PRE #4 Sample Station
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Comments:

Signature

10/9/2006
Date

*If, during the first year of monitoring, any individual quarter's average will cause the running annual average of that system to exceed the standard, then the system is out of compliance at the end of that quarter.

ATTACHMENT 3

3/28/02

MARIN / SONOMA
MOSQUITO AND VECTOR CONTROL DISTRICT

First Organized District in California

595 HELMAN LANE, COTATI, CALIFORNIA 94931
TELEPHONE (707) 285-2200 FAX (707) 285-2210

RECEIVED
Point Reyes
FEB 14 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

BOARD OF TRUSTEES

PRESIDENT
CLAIRE McAULIFFE
BELVEDERE

VICE PRESIDENT
CHARLES BOUEY
SONOMA

SECRETARY
HENRY FUHS
COTATI

TAMARA DAVIS
SONOMA COUNTY AT LARGE

ANNA SEARS
SONOMA COUNTY AT LARGE

KIRSTEN SULLIVAN
CLOVERDALE

HEALDSBURG

PAUL LIBEU
ROHNERT PARK

STEVE AYALA
PETALUMA

JOHN "JACK" HEALY
SANTA ROSA

CRAIG LITWIN
SEBASTOPOL

DON MONK
WINDSOR

KATHARINA SANDIZELL-SMITH
MARIN COUNTY AT LARGE

ED SCHULZE
MARIN COUNTY AT LARGE

NANCY BARNARD
CORTE MADERA

FRANK EGGER
FAIRFAX

TOM BRADNER
LARKSPUR

CARRIE SHERRIFF-ROSENBERG
MILL VALLEY

HERMAN ZWART
NOVATO

WENDY McPHEE
ROSS

JIM LAMMERS
SAN ANSELMO

LILA McCARTHY
SAN RAFAEL

SAUSALITO

ROGER SMITH
TIBURON

ADMINISTRATION

MANAGER
JAMES A. WANDERSCHEID

ASST. MANAGER/VECTOR
ECOLOGIST
RON KEITH

February 13, 2007

ATTN: Superintendent
Giacomini Wetland Restoration Project
DEIS/EIR, Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Dear Mr. Neubacher,

In our review of the proposals for Giacomini Ranch restoration project findings that we are in agreement with the park services' selection of alternatives C or D. Tidal recirculation is a preferred method to minimize mosquito production thereby reducing the amount of pesticide necessary to control mosquito populations. While both alternatives provide the greatest wetland value they are not completely without potential problems with regard to Culicidae production.

During the construction phase of the project, impounded water should be avoided. Surveillance of the construction site and surrounding area will be required to address any situation that would produce disease vectors as well as salt marsh species. While projects of this magnitude take years to stabilize, the interim period will require close monitoring. As previous experience has demonstrated with tidal recirculation in the Petaluma marsh, occasional populations of Culicidae need to be controlled due to the dynamic nature of the ecosystem. Access for surveillance utilizing battery-powered traps will be necessary to determine the presence or absence of mosquito populations. In addition, larval surveillance will be necessary to determine species and extent of production on site.

The fresh water component for the enhancement and preservation of red legged frog has the highest potential of supporting disease vector mosquito, specifically *Culex tarsalis, Culex erythrothorax, Culex stigmatosoma,* and *Culex pipiens pipiens.* Previous experience at a number of fresh water restoration habitats has been problematic with regard to mosquito production. To mitigate requires a comprehensive maintenance and management plan to address excessive and invasive vegetation, nutrient

input reduction, and access for control efforts, if needed. Surveillance in the fresh water wetland component will be essential to determine the presence or absence of vector Culicidae.

We applaud the Pt. Reyes staff for the extensive documentation and selection of a plan that will return the Giacomini Ranch property to historical wetland for the benefit of wildlife and the community.

Thank you, for the opportunity to comment on the project and we look forward to seeing the completion of the project.

Sincerely,

Ronald D. Keith, Assistant Manager/Vector Ecologist
Chuck Krause, District Superintendent

RECEIVED
Point Reyes
FEB 15 07
SUPT.
SCIENCE
SPEC PK USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

DEPARTMENT OF PUBLIC WORKS

COUNTY OF MARIN
www.co.marin.ca.us/pw

ADMINISTRATION
499-6528

ACCOUNTING
499-6576 • FAX 507-2899

AIRPORT
451-A AIRPORT ROAD
NOVATO, CA 94945
897-1754 • FAX 897-1264

BUILDING MAINTENANCE
499-6576 • FAX 499-3250

CAPITAL PROJECTS
499-7877 • FAX 499-3724

COMMUNICATION MAINTENANCE
499-7313 • FAX 499-3738

DISABILITY ACCESS
499-6528 (VOICE)
499-3232 (TTY)

ENGINEERING & SURVEY
499-7877 • FAX 499-3724

FLOOD CONTROL DISTRICT
499-6528

COUNTY GARAGE
499-7380 • FAX 499-7190

LAND DEVELOPMENT
499-6549

PRINTING
499-6377 • FAX 499-6617

PURCHASING AGENT
499-6371

REAL ESTATE
499-6578 • FAX 446-7373

ROAD MAINTENANCE
499-7388 • FAX /499-3656

STORMWATER PROGRAM
499-6528

TRAFFIC ENGINEERING
499-6528

TRANSIT DISTRICT
499-6099 • FAX 499-6939

WASTE MANAGEMENT
499-6647 • FAX 446-7373

ALL AREA CODES ARE 415

P. O. Box 4186, San Rafael, CA 94913-4186 • 415/499-6528 • FAX 415/499-3799 • TTY 415/499-3232

Kachad Mansourian, RCE
Director

February 14, 2007

Mr. Don Neubacher, Superintendant
United States Department of the Interior
National Park Service
Point Reyes, CA 94956

RE: Comments on Draft Environmental Impact Statement (DEIS/DEIR)
Giacomini Wetlands Restoration Plan

Dear Mr. Neubacher:

The Marin County Department of Public Works (DPW) appreciates the opportunity to provide comments on the subject DEIS/DEIR. Our specific comments and concern are as follows:

1) The DEIS/DEIR identified a southern perimeter trail from a proposed bridge across Lagunitas Creek to White House County Park. No specifics were provided on the exact alignment and whether the pathway is proposed to be inside or outside of the county right of way. Please provide details in the environmental document. Any potential traffic impacts from the trail construction and use were also specifically not addressed.

2) The DEIS/DEIR identified a future public access trail extension from White House Pool County Park northward towards Inverness Park that would be constructed in collaboration with the County of Marin. The roadway is narrow and abuts wetlands or watercourses. Please provide more details on this proposed project segment. Please clarify whether a subsequent environmental document would be required prior to this extension being constructed.

3) The County's General Plan and Bicycle and Pedestrian Master Plan both identify a Class I pathway linking the village of Pt. Reyes Station with Inverness Park and Inverness. The Preferred Alternative (Alternative C), as well as Alternatives A and B, have the ability to provide this linkage (noted as the 'Southern Perimeter Trail') while the Environmentally Preferred Alternative (Alternative D) does not, as Alternative D does not feature the necessary bridge.

A concern raised by many residents of the area is that Sir Francis Drake Blvd in this area is undesirable for bicyclists and pedestrians, especially children. Therefore, parents drive their children to school instead of the children walking or biking. Residents also drive between the two villages when many mentioned that biking would be preferable. Further, visitors to the area will be forced to drive

l:\eric steger\correspondence\giacominideircomments.doc

from trailhead to trailhead under Alternative D as there would be no means to through-hike.

The attendant increase in vehicle trips because of these concerns negatively affects air quality through additional unnecessary vehicle miles traveled, increased noise levels, and a degraded visitor experience. The geometric constraints of Sir Francis Drake Blvd, including several homes located immediately adjacent to it near Shoreline Highway, preclude a pathway immediately adjacent to the roadway. Provision of a pathway connection as outlined in Alternatives A, B, and C would address a critical need of the communities in the area as well as provide a continuous link around the restoration area and a connection with other walking trails within the Seashore for an improved visitor experience.

Per Caltrans design standards, a Class I pathway has a minimum paved width of 8 feet, with firm shoulders on either side. It is our recommendation that under Alternatives A, B, or C a paved Class I pathway be provided on the Southern Perimeter Trail between the trailhead in Pt. Reyes Station at 3rd and C Streets and the White House Pool property, and to extend this pathway at a minimum to the intersection of Sir Francis Drake Blvd and Bear Valley Road. Additionally, are the trails intended to be multimodal, for use by pedestrian, bicyclist or equestrian? Will all trails be accessible, and if so, to what standards (sidewalk, pathway or trails, to regulations or guidelines?). We also could not find a typical cross section, minimum width, standard surfacing, etc. in the environmental document.

4) The proposed project identifies a crosswalk along Sir Francis Drake Blvd. to connect the bridge crossing to Bear Valley Creek Trail. The DEIS/DEIR did not provide details on whether crosswalk is warranted nor analyzed any traffic or pedestrian hazards from such a crosswalk. Prior to construction of such a crosswalk, additional traffic and safety analysis would need to be provided to the County.

5) The proposed project shall comply with the County's local ordinance requiring encroachment permits for any work or facility that are constructed in the right-of-way, and the project must comply with the time, place, and manner restrictions established in the permit. In addition, construction methods, traffic control and accessibility compliance are not completely described in the document and will be required with the encroachment permit application. Provide information on proposed traffic control measures, and indicate if any lane closures are desired.

6) Various culverts are proposed to be replaced along county maintained right of ways. Before the County will approve the work, we will require that detailed hydrology and hydraulic analysis be provided to ensure that the project will not result in any increased risk of flooding. We are also concerned that the project design incorporates the County's need to maintain county roads and culverts, including clearance for equipment and personnel.

7) Please clarify whether there will be traffic generated on public roads from the import or export of needed construction materials, such as fill material, and the expected routes, especially if the Point Reyes Station village streets are used.

Lastly, there is no agreement on division of maintenance responsibility for trails that may exist or be built in the right of way, and the county has not budgeted for any potential

capital improvements. We encourage the National Park Service to work with the County on any needed agreements as the project components are being developed.

Very truly yours,

Eric Steger
Senior Civil Engineer

c: Farhad Mansourian
Craig Tackabery
Tim Haddad, CDA
Ed Hume, P&OS

I:\eric steger\correspondence\giacominideircomments.doc

"McNamee, Sharon" <SMcNamee@co.marin.ca.us>
02/14/2007 04:55 PM PST

To: <pore_planning@nps.gov>
cc: "Crosse, Liza" <LCrosse@co.marin.ca.us>, "Steger, Eric" <ESteger@co.marin.ca.us>, "Lewis, Liz" <LizLewis@co.marin.ca.us>, "Hulme, Ed" <EHulme@co.marin.ca.us>
Subject: ATTN: Final draft NPS - Giacommini Ranch Restoration Project EIR Comments

February 14, 2007

Don Neubacher,
Superintendent Point Reyes National Seashore
1 Bear Valley Road, Point Reyes Station, CA 94956
Submitted by E-mail: February 14, 2007

Subject: NPS - Giacommini Ranch Restoration Project EIR Comments

SENT VIA EMAIL

Dear Superintendent Neubacher-

We respectfully submit the following comments regarding the NPS - Giacommini Ranch Restoration Project EIR.
We are excited about the restoration project and the overall positive impacts for the region and Tomales Bay. The Parks and Open Space Department is primarily focusing our comments on the areas we manage known in your document as the White House Pool Park and the Green Bridge Park.

The Whitehouse Pool Park parking lot is heavily used and is one of the main access points for viewing the southern portion of the preserve; therefore, we feel the following improvements and issues should be included in analysis of the project:

- Allow access from C Street to the Southern Spur Trail and to the new bridge across the creek. We feel that this is a safer route than Highway 1 and Sir Francis Drake Blvd. for most users, including children and equestrians. It also reduces the potential environmental impact that would result from changes to the Green Bridge wetlands area
- Increase the elevation of the White House Pool parking lot to reduce flooding and provide year round access
- Provide for trail repair if the restoration work/improvements causes erosion or damages the existing trail network through the County park.
- Construct an elevated boardwalk for multi-use purposes, if the current trail system through the Whitehouse Pool Park is not functional after restoration work
- Include a fully accessible, raised viewing platform at the Whitehouse Pool Park site. We acknowledge that we could reduce the number of viewing points currently in place along the creek edge.
- Address drainage/flow issues in and adjacent to the parking lot
- Consider protection of the existing wooden bridge near the Whitehouse Pool parking lot as a part of the trail system
- Address needed maintenance and improvements of drainage facilities throughout the area with specific attention paid to flooding in the area of White House Pool and the Tomasini Creek – Mesa Road area
- Consider multi-model transportation needs to include sufficient space and all weather access in and around the project area, recognizing possible conflicts may occur with multiple users such as bikes, children, horses and dogs
- Replace the current portable toilets at the White House Pool parking lot with a permanent fully accessible, full-service restroom recognizing there will be an increase in usage

- Coordinate agencies regulations and signage for public viewing and access for the entire project site

We look forward to continuing to work with you and interested parties to make this a successful project.

Sincerely,

Sharon McNamee
Director and General Manager Marin County Parks and Open Space

CC: Supervisor Steve Kinsey
Eric Steger, DPW
Liz Lewis, DPW
Gordon Bennett, Sierra Club
Ed Hulme, Marin County Parks

Email Disclaimer: http://www.co.marin.ca.us/nav/misc/EmailDisclaimer.cfm

STATE OF CALIFORNIA, RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

DEPARTMENT OF CONSERVATION
DIVISION OF LAND RESOURCE PROTECTION
801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814
PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

RECEIVED
Point Reyes
National Seashore
FEB 15 07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 13, 2007

Mr. Eric L. Gillies
California State Lands Commission
100 Howe Avenue, Ste 100 South
Sacramento CA 95825

Don Neubacher, Superintendent
Giacomini Wetland Restoration Project DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Pt. Reyes Station, CA 94956

Subject: SCH# 2002114002 - Draft Environmental Impact Report/Statement for the Giacomini Wetlands Restoration Project, Marin County

Dear Mr. Gillies and Superintendent Neubacher:

The Department of Conservation's Division of Land Resource Protection (Division) monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act, California Farmland Conservancy Program, and other agricultural land conservation programs.

The California State Lands Commission and the National Park Service are acting as lead agencies in preparation of the document cited above. The proposed project involves wetland restoration of the Giacomini Ranch and Olema Marsh. The Giacomini Ranch is located at the southern end of Tomales Bay; a 6,800 acre, 12 mile long mile wide estuarine embayment that runs along Point Reyes National Seashore's north perimeter. Together, the ranch and the marsh comprise the project area. The ranch has historically supported dairy operations. The Park Service currently owns approximately 550 acres of the ranch. The State Lands Commission owns a portion of Lagunitas Creek between the ranch's east and west pastures. The Park Service owns approximately 50 percent of Olema marsh. A non-profit organization, the Audubon Canyon Ranch owns the East and West Pastures of the Ranch.

Williamson Act

Some of the land that may be converted to non-agricultural uses is under Williamson Act contract. The California Land Conservation Act (Government Code §51200 et seq.) of 1965, commonly known as the Williamson Act. The document correctly reflects that

the Act provides a tax incentive for the voluntary enrollment of agricultural and open space lands in contracts between local government and private landowners. The contract enforceably restricts the land to agricultural and open space uses, and compatible uses defined in state law and local ordinances. An agricultural preserve, which is established by local government, defines the boundary of an area within which a city or county will enter into contracts with landowners. Local governments calculate the property tax assessment based on the actual use of the land instead of the potential land value assuming full development.

Williamson Act contracts are for 10 years and longer. The contract is automatically renewed each year, maintaining a constant, ten-year contract, unless the landowner or local government files to initiate non-renewal. Should that occur, the Williamson Act would terminate 10 years after the filing of a notice of non-renewal. Only a landowner can petition for a contract cancellation. Tentative contract cancellations can only be approved after a local government makes specific findings and determines the cancellation fee to be paid by the landowner. The County and Coastal Zone LLP have identified maintenance of agricultural resources as a priority. The document indicates that the East and West Pastures (currently under contract) will have no agricultural land management involved with any of the project alternatives. We suggest that the landowner and local government rescind the Williamson Act contract and re-enter into an Open-Space contract as long as the acreage is privately owned.

Public Acquisition

The document indicates that there may be additional acquisitions that would expand the Wildlife Area in the future, but does not elaborate. Any future acquisition would require additional environmental documentation, and we ask that we receive a copy of the documents for our review and comment. As is required by Government Code section 51291©, we request that the Director of the Department of Conservation receive notification of any proposed acquisition within 10 days of its occurrence, as the subject land may be under Williamson Act contract. Government Code section 51291 specifies the notification provisions of the Williamson Act when there is a possible acquisition of Williamson Act lands. We suggest that sections 51290 – 51295 be reviewed in detail. Please do not hesitate to contact the Division for assistance, and we would be pleased to meet with you when an acquisition is planned to discuss statutory requirements for such an action.

Land Evaluation and Site Assessment and Impact Analysis

The document provides a discussion regarding the Land Evaluation and Site Assessment model. Its use is required under the Code of Federal Regulations, and is a tool that is encouraged under California Environmental Quality Act. The final EIS/EIR should include the computation and provide an explanation of the resultant finding. The document also indicates that an expanded range of impact thresholds has been developed based on the LESA guidelines for evaluation of intensity of impacts (page 419). The FEIS/EIR should contain this "expanded range of thresholds", and provide

rationale for how these thresholds apply to the proposed project. As the state agency charged with monitoring statewide agricultural land conversion, and charged under CEQA as the agency responsible for reviewing such impacts, we cannot concur with a finding that conversion of the east and west pastures to non-agricultural uses would be less than significant unless additional clarifying detail is provided.

Thank you for the opportunity to review this EIS/EIR. We look forward to receiving your response. Please contact Jeannie Blakeslee at (916) 323-4943 should you have any questions regarding these comments. Hard copy delivered via US Mail.

Sincerely,

Jeannie Blakeslee for

Brian Leahy
Assistant Director

cc: VIA EMAIL www.Park_Planning@nps.org

State of California – The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

ARNOLD SCHWARZENEGGER, Governor

RECEIVED
Point Reyes
FEB 9 - '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 7, 2007

Mr. Don Neubacher
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

Dear Mr. Neubacher:

Subject: Giacomini Wetlands Restoration Project Draft Environmental Impact Report

The Department of Fish and Game (DFG) supports the proposed Giacomini Wetlands Restoration Project in an effort to restore hydrologic and ecological process and functions to the project area and, in a larger context, restoration of the Tomales Bay watershed. The lead agency, the National Park Service, has selected Alternative C as the preferred alternative which includes full restoration of the Giacomini Ranch East and West Pastures and restoration of Olema Marsh, with moderate development of public access paths within the project area.

Alternative C involves the complete removal of several levees in the East and West Pastures, grading, revegetation and integration of the Olema Marsh into the restored wetland complex. Other important elements of this project include dedication of project areas' appropriative water rights to in-stream flow uses, removal of the "Main Dairy" from upland areas, removal of high priority invasive plants, removal of worker housing along Tomasini Creek, and other restoration management actions.

During implementation of this project there is the potential for short term and/or long term impacts to several special status State/Federal species and their habitat including: California clapper rail, central coast coho salmon, California brown pelican, Least Bell's vireo, California red-legged frog, as well as other species. Please be advised that a California Endangered Species Act (CESA) Permit must be obtained if the project has the potential to result in take of species of plants or animals listed under CESA, either during construction or over the life of the project. Issuance of a CESA Permit is subject to CEQA documentation; therefore, the CEQA document has specified impacts, mitigation measures, and a mitigation monitoring and reporting program.

For any activity (such as levee removal or stream channel re-alignment), that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of SAAs is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document for the project. To obtain information about the SAA notification process, please access our website at www.dfg.ca.gov/1600; or to request a notification package, contact the Streambed Alteration Program at (707) 944-5520.

If you have questions, please contact Mr. Jeremy Sarrow, Environmental Scientist, at (707) 944-5573; or Mr. Greg Martinelli, Water Conservation Supervisor, at (707) 944-5570.

Sincerely,

Charles Armor
Acting Regional Manager
Bay Delta Region

cc: Mr. Ryan Olaf
U. S. Fish and Wildlife Service
2800 Cottage Way, Suite W 2605
Sacramento, CA 95829

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

RECEIVED
Point Reyes
FEB 14 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 14, 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Attn: Giacomini Wetlands Restoration

Subject: Giacomini Wetland Restoration Project Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) [CEQ #20060[illegible]

Dear Mr. Neubacher:

The U.S. Environmental Protection Agency (EPA) has reviewed the above referenced document. Our review and comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's (CEQ) NEPA Implementation Regulations at 40 CFR 1500-1508, and our NEPA review authority under Section 309 of the Clean Air Act.

EPA supports the objectives of this project and believes the proposed project will significantly improve the hydrologic and ecological processes and functions in the Tomales Bay watershed. We have, therefore, rated this Draft EIS/EIR as LO – Lack of Objections (see enclosed "Summary of Rating Definitions"). We recommend additional mitigation measures to minimize potential impacts from spills during construction/ restoration activities in this highly sensitive project area. We also recommend that the Final EIS/EIR provide more specific information regarding the project's estimated nitrogen dioxide emissions and conformity to the State Implementation Plan.

We appreciate the opportunity to review this Draft EIS/EIR and request a copy of the Final EIS/EIR when it is officially filed with our Washington, D.C., office. If you have any questions, please call me at (415) 972-3846, or have your staff call Jeanne Geselbracht at (415) 972-3853.

Sincerely,

Nova Blazej, Manager
Environmental Review Office

Printed on Recycled Paper

Spill Prevention and Response Plan

The Draft EIS/EIR specifies several effective measures that will be required during construction to avoid contaminant spills. In this sensitive project area, we strongly encourage stringent best management practices and recommend additional measures be included in these requirements.

Recommendation: We recommend the following additional measures to minimize the impact of potential spills.

- A spill kit with boom and sorbent materials should be on site at all times during construction;
- No vehicles will be fueled, lubricated, or otherwise serviced within 100 feet of the normal high-water area of any surface water body.

Recommendation: We also recommend you contact Peter Reich in EPA Region 9's Oil Program at 415-972-3052 to discuss the project's intended operations to ensure compliance with any oil spill regulations that may apply to the project.

Air Emissions

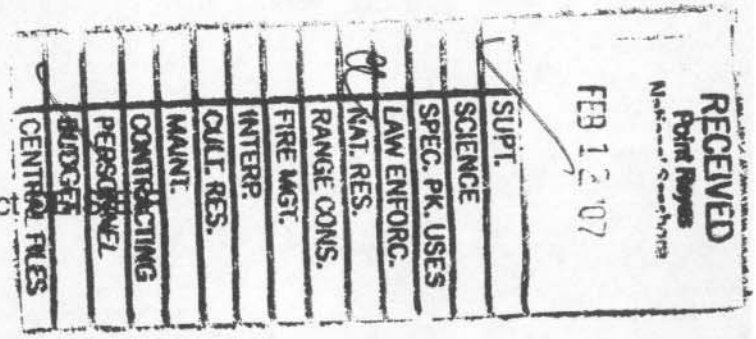
The Draft EIS/EIR indicates that, under the proposed project, earth moving equipment during restoration activities would potentially generate major or substantial amounts of nitrogen dioxide (NOx). For purposes of this EIS/EIR, "major or substantial emissions" are emissions greater than 80 pounds per day. The Bay Area is a non-attainment area for ozone. The General Conformity requirement of the Clean Air Act (CAA) mandates that the Federal Government not license, permit, or approve any activity not conforming to an approved CAA implementation plan. However, the Draft EIS/EIR does not include the projected NOx emissions for the proposed project or indicate whether the project conforms to the State Implementation Plan (SIP). Additional information is needed in the Final EIS/EIR to demonstrate that the project conforms to the SIP.

Recommendation: The Final EIS/EIR should provide NOx emissions estimates for the proposed project and discuss how the project conforms to the SIP. The National Park Service should work with the Bay Area Air Quality Management District to ensure that anticipated emissions from the proposed project are consistent with the applicable SIP.

Organization Comments

California Native Plant Society

February 9, 2007



Don L. Neubacher, Superintendent
Attn: Giacomini Wetlands Restoration Project
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Dear Superintendent Neubacher,

The Board of Directors, Marin Chapter, California Native Plant Society (CNPS), strongly supports the adoption of Alternative D. We do so because it provides the basis for the most complete restoration and continued protection of the area included within the proposed project. Alternative C also provides almost equal recovery, but the inclusion of a possible transportation corridor from Inverness Park to Point Reyes Station could result in unwanted intrusion into sensitive areas. Alternatives, A and B as well as the No Action alternative do not provide adequate recovery. If the preferred Alternative C is adopted, measures should be taken to protect the area from off trail public intrusion.

We note that under Alternative C and D considerable quantities (160,000 cubic yards for Alternative D) of surplus soil are scheduled to be deposited in old quarries located on Tomales Point within Point Reyes National Seashore. Some of these quarries have CNPS listed plant species on their immediate borders. Protection of these species during soil disposal and subsequent monitoring for invasive plant species should be provided.

Sincerely,

Robert Soost

Robert Soost
Board of Directors
Marin Chapter, CNPS

Brannon Ketcham

01/25/2007 11:20 AM PST

To: Lorraine Parsons PORE/NPS@NPS
cc:
Subject: Fw: EAC Announcement: Giacomini Restoration Plan - Public meeting tomorrow night.

Brannon Ketcham
Hydrologist,
Point Reyes National Seashore
Point Reyes Station, CA 94956
(415) 464-5192
----- Forwarded by Brannon Ketcham/PORE/NPS on 01/25/2007 11:19 AM -----

"Frederick Smith, Jr., Environmental Action Committee of West Marin" <eac@svn.net>

01/24/2007 03:21 PM PST

To: brannon_Ketcham@nps.gov
cc: kabk@comcast.net
Subject: EAC Announcement: Giacomini Restoration Plan - Public meeting tomorrow night.

Dear Brannon and Kathleen,

Happy 2007 to all of you.

First let me say how happy I am to be your new Executive Director at the EAC of West Marin. I only started my new position a few weeks ago but I already feel comfortable thanks in part to all of the support I have received from the EAC membership. In particular, I'd like to thank our board members who put their heart and energy into helping to protect the best of West Marin for ourselves and future generations to enjoy.

In this light, the National Seashore's Giacomini Wetlands Restoration Project proposal is out for public review and the EAC is excited to see Point Reyes National Seashore's support for extensive restoration of the wetlands at the south end of Tomales Bay for the benefit of wildlife, including Coho salmon that spawn in Lagunitas and Olema Creeks.

The EAC supports Alternative D with one modification, because it is the alternative that provides for the most extensive restoration potential. We support modifying Alternative D to include a bridge over Lagunitas Creek, which would connect the existing levees paths on either side. This will create a continuous, low-impact trail between the White House Pool parking lot and the Green Bridge.

Please attend the Seashore's public meeting tomorrow evening, Thursday, January 25th at 6:30 p.m. at the Park Headquarters' Red Barn Classroom to inform the public and get input on the plan.

The EAC believes that the Seashore's preferred Alternative C, while a great step in the right direction, is not the best option for a full restoration of the wetlands. Alternative D, with the addition of the bridge over Lagunitas Creek, is the best plan to fully restore the wetlands and improve public access.

For more information on the plan, go to:
http://www.nps.gov/pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

The Park is accepting written letters on this proposal until February 14. Please consider sending a letter or e-mail to:

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956
Attn: Giacomini Wetlands Restoration Project
E-mail: parkplanning@nps.gov

Thank you all for your support of the EAC of West Marin.

For Truth, Justice and the Riparian Way.

Fred

--
Frederick Smith, Jr.
Executive Director

Environmental Action Committee of West Marin
Protecting West Marin since 1971
Box 609
Point Reyes Station, CA 94956
tel: 415-663-9312
fax: 415-663-8014
email: eac@svn.net
http://www.eacmarin.org

"Frederick Smith, Jr." <eac@svn.net>
02/14/2007 04:18 PM PST

To: pore_planning@nps.gov
cc:
Subject: Attn: EAC's Giacomini Wetland Restoration Project Comments

Hello,

Thanks for the opportunity to comment on behalf of the Environmental Action Committee of West Marin. Our comments are attached and pasted below.

Sincerely,

Frederick Smith

07.doc

February 14, 2007

RECEIVED
Point Reyes
FEB 14
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Don Neubacher, Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Attn: Giacomini Wetlands Restoration Project

Dear Superintendent Neubacher,

Thank you for the opportunity to comment on the Giacomini Wetland Restoration Project Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR). The Environmental Action Committee of West Marin (EAC) wholeheartedly supports Point Reyes National Seashore's (PRNS) effort to restore much of the Giacomini Ranch property and Olema Marsh (herein known as Tomales Bay Wetlands) to their natural state. PRNS staff and financial contributors should be commended for the amount of time and effort put into making this restoration project a reality.

After careful thought and consideration, the EAC supports Alternative D because it is the best alternative to ensure the largest restoration potential for the Tomales Bay wetlands and the watershed. Alternative D is the Environmentally Preferred Alternative in the DEIS/DEIR for the reason that it 1) provides the most extensive restoration of the system and 2) minimizes future adverse effects to birds, salmon and other wildlife species from the baseline of natural habitat

February 14, 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Attn: Giacomini Wetlands Restoration Project

Dear Superintendent Neubacher,

Thank you for the opportunity to comment on the Giacomini Wetland Restoration Project Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR). The Environmental Action Committee of West Marin (EAC) wholeheartedly supports Point Reyes National Seashore's (PRNS) effort to restore much of the Giacomini Ranch property and Olema Marsh (herein known as Tomales Bay Wetlands) to their natural state. PRNS staff and financial contributors should be commended for the amount of time and effort put into making this restoration project a reality.

After careful thought and consideration, the EAC supports Alternative D because it is the best alternative to ensure the largest restoration potential for the Tomales Bay wetlands and the watershed. Alternative D is the Environmentally Preferred Alternative in the DEIS/DEIR for the reason that it 1) provides the most extensive restoration of the system and 2) minimizes future adverse effects to birds, salmon and other wildlife species from the baseline of natural habitat conditions, not the present, altered state off the land.

The EAC *opposes* the pre-fabricated bridge over Lagunitas Creek advocated for in Alternative C and, thus, the southern Perimeter Trail as proposed in the DEIS/DEIR. While this public access component initially made sense on a conceptual level, more careful study reveals that the sheer size of the bridge that would be required, trail maintenance/construction requirements and increased human use in this area could have negative effects upon wildlife use and the restoration potential of the area. Perhaps there will be opportunities in the future to build a trail connection between the Green Bridge and White House Pool via the levee road corridor. The Lagunitas Creek watershed has already incurred serious damage upstream due to intense human development inside the stream buffer. We believe that future incursions to the streamside setbacks should be minimized and, if possible, completely avoided.

While Alternative C provides many of the ecological benefits in Alternative D, large potential increases in human use adjacent to Tomocini and Lagunitas Creeks, could negatively affect habitat use and quality. The fact is there are already abundant human access points in Point Reyes National Seashore and within a few miles of the project area. While improved access in the project area should be an important consideration, it should not intrude upon the natural restoration of the Tomales Bay wetlands and Olema Marsh.

One thing that is missing from the DEIS/DEIR analysis is the potential effects of public access to wildlife and ecological resources from a baseline of naturally occurring habitat conditions, rather than its current altered state. Utilizing the DEIS/DEIR's analysis alone, it is difficult to assess the real, continuous impacts of increased human use and trail intrusion into what could eventually be a naturally restored wetland system free from intense human presence. Please consider including an analysis in the Final Environmental Impact Statement/Report that looks at baseline conditions for these habitat types and assesses the effects of increased human use upon wildlife and maintenance funding concerns. This will help the public understand how PRNS' support of Alternative C ensures that future human activities in the project area are in harmony with the area's irreplaceable wildlife, scenic and other natural resources.

Also, please consider changing the name from the Giacomini wetlands to the Tomales Bay wetlands, as the ranch itself is the impediment to recovery, not its solution. Considering that this project stands to restore up to 50% of Tomales Bay's wetlands, it doesn't sound unreasonable that it should be named after the bay. The new name is also supported by a wide cross section of the local populace.

In conclusion, thanks you for your dedication to making this restoration process a reality. It is truly one of the biggest legacies of your time as PRNS Superintendent. It both excites and gives me hope that natural resource management in the United States is on the right track. This restoration project is a role model to the United States and the world.

Sincerely,

Frederick M.R. Smith, Jr.
Executive Director

I

Collaborative Comments by the Marin County Bicycle Coalition, the Community Pathways Committee, the Sierra Club, Access4Bikes, and Transportation Alternatives for Marin on the Giacomini Ranch Wetlands Restoration Project DEIR

February 14, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes, CA 94956
(This letter is also being postmarked and mailed today)

Attention: Giacomini Wetlands Restoration Plan

Subject: DEIR comments

Dear Superintendent Neubacher:

The Marin County Bicycle Coalition, in partnership with the Sierra Club, the Community Pathways Committee, Access 4 Bikes, and Transportation Alternatives for Marin have reviewed the DEIR for the Giacomini Ranch Wetlands Restoration Project and respectively request that the National Park Service (NPS) choose the following as its plan for the restoration: :

We recommend Alternative D with the addition of the Southern Perimeter Path as noted in Alternative C and with the following additional considerations:

1. The multi-use pathway should extend all the way from Point Reyes Station to Inverness Park and on to the North Levee.
2. The pathway should provide a safe, stable, permeable surface for bicycle and pedestrian use, such as is provided by decomposed granite with a pine resin binder.
3. Funding for the public access portion of the project should be secured concurrently with the restoration funds, and should be installed simultaneously.
4. Design, funding and maintenance of non-NPS-owned land should be agreed to in advance through a Memorandum of Understanding between the NPS and the County of Marin (on whose lands the path will occur).

Throughout the past three years of public comment on this issue, NPS has seen tremendous support for the Southern Perimeter Path from local residents. The idea of a path in this area has a long history in West Marin, dating back more than 30 years to the formation of the West Marin Paths group in the late 1970's.

This new path will link residences with schools and public services such as the post office and library, and with local businesses, making it possible for people to travel safely between Point Reyes Station and Inverness Park without walking or riding along narrow country roads.

Environmental stewardship, walking and bicycling go hand-in-hand. The more opportunities people have to walk and bike rather than drive, the more we reduce air pollution, water pollution and runoff from parking lots and roads in our fragile local ecology

The Southern Perimeter Path will allow bike/ped access along the wetland's perimeter, as well as provide viewpoints for birding and observation of the newly restored wetland. In this way, the path will expand NPS's ability to provide public access to the publicly-owned wetlands.

The Marin County Bicycle Coalition and its partners respectfully ask the NPS to make intermodal transportation between Point Reyes Station and north of Inverness Park a reality by including the Southern Perimeter Trail in the Final EIR, along with a pledge to secure the funding for the project, and to work concurrently with the County of Marin on an MOU. This collaborative agreement will improve public safety, help reduce motor vehicle trips (which degrade wetlands,) and help fulfill an NPS mission of providing public access to its lands.

Signed:

Kim Baenisch
Executive Director
Marin County Bicycle Coalition
P.O. Box 1115
Fairfax, CA 94978

Gordon Bennett
Chair, Marin Group
The Sierra Club

Dona Larkin
Community Pathways Committee
Pt. Reyes Station, CA
94956

Alex Burnham
President
Access 4 Bikes
P.O. Box 526
Pt. Reyes Station, CA
94956

Patrick Seidler
President
Transportation Alternatives for Marin
187 E. Blithedale Avenue
Mill Valley, CA 94941

Cc: Steve Kinsey, Marin County Fourth District Supervisor
Farhad Mansourian, County of Marin Public Works Director
Congresswoman Lynn Woolsey
Senator Barbara Boxer
Senator Dianne Feinstein
Assemblyman Jared Huffman
Senator Carole Migden

Point Reyes Lodging Association

2/13/07

ATTN: Superintendent: re. Giacomini Wetland Restoration Project DEIS/EIR

Point Reyes Lodging is a group of seventeen professional lodging properties in the Point Reyes area. As residents of the area and hosts to visitors year round to the Point Reyes National Seashore area we would like to provide input on the selection of a preferred option for the Giacomini Wetland Restoration Project.

Because many of our guests are interested in visiting and experiencing the natural beauty of the area we support an option that would provide the most access for viewing and interacting with the wetland area. Options A & B provide the most public access. Option C, while not including the Eastern Perimeter trail on the railroad right of way does include the connection bridge at White House Pool and the option for extending the Southern path to Inverness Park.

Point Reyes Lodging urges the park to include public access that includes both viewing the wetland area and helping to create a network of paths off-road between our communities and urges the park to take into consideration the environmental benefits of providing an alternative to driving motor vehicles around the wetland area and between communities.

Thank you for consideration on this matter.

Sincerely,
Point Reyes Lodging
PO Box 878
Point Reyes Station, CA 94956
415-663-1872

RECEIVED
Point Reyes
National Seashore
FEB 15 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Point Reyes Station Village Association
P.O. Box 476
Point Reyes Station, CA 94956

February 12, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

Subject: Giacomini Wetlands Restoration Plan- Comments on Draft EIS/EIR

Dear Superintendent Neubacher:

The Point Reyes Station Village Association is a community forum for considering land use proposals in the Point Reyes Station area. Through our Design Review Committee, we regularly provide comments on local development matters to the County of Marin and other agencies. Our comments are guided by the Point Reyes Station Community Plan of 2001.

We agree with the references and interpretations of the Community Plan made in the draft EIS/EIR. One goal of the Community Plan that is particularly relevant for the project deserves repetition here. It is the goal of protecting the residential uses, next to commercial and public uses, in the historic downtown area of Point Reyes Station. If residential use is driven out by increased traffic, parking, noise and litter, the unique character of our town will be lost. We appreciate the attention shown to this issue in the draft EIS/EIR, but much of the detailed planning of the park-town interface must await the outcome of the proposed land exchange of parcels along C Street.

Two minor corrections should be made: In some places, the year of the Community Plan is given as 2000. It should be 2001. The reference to the zoning designation of the parcels on C Street (for instance, in the text on page 615), is incorrect. The zoning C-R-A:B-2 translates into Coastal Residential, Agricultural (10,000 sq. ft. minimum lot size), not into "Commercial/Residential", as stated.

We have followed this project from its inception and have previously commented on various aspects of it. Information contained in the draft EIS/EIR has caused us to rethink some of our earlier comments, and to confirm others.

As a result of our review, **we support Alternative D**, the environmentally preferred alternative. Our specific comments on the proposals in the Draft EIS/EIR are as follows:

1. **Restoration Measures**. We support the restoration measures described in Alternative D. The two main differences between C and D are (a) excavation to inter-tidal elevations in the southern portion of the east pasture, and (b) improvement of creek flow from Tomasini Creek by various measures. Taking the

long view, we find that the 20% increase in excavation volume (from 200,000 cubic yards in Alternative C to 251,000 cubic yards in Alternative D) is acceptable. The advantages of Alternative D by better integrating Tomasini Creek into the restoration are stated in the letter from Jules Evens, which we incorporate in our letter.

2. **Public Access**. We support the limited public access resources provided in Alternative D, i.e., no bridge connection between the existing southern perimeter footpath and the County's White House Pool trail, and no Mesa Spur Trail. Our specific comments on public access resources are as follows:

Southern Perimeter Trail (contemplated in Alternative C). As a concept, a safe trail connection between Point Reyes Station and Inverness Park is popular and reasonable. Upon closer examination of the surrounding facts, however, we are unable to support the actual trail being proposed. Our opposition to the trail is based on the following considerations (listed not necessarily in the order of priority):

- Length and height of bridge and its estimated cost are excessive in relation to the proposed use.
- Introduction of man-made structure into area currently open and devoid of man-made structures (other than the levee berms which are to be removed).
- Impacts on scenic views from White House Pool and other points.
- Potential for future changes in natural channel of Lagunitas Creek and consequent need to regulate creek flow to fit the bridge instead of encouraging natural creek flow.
- Question whether the proposed trail would significantly contribute to reduced automobile use, given that it is less than one mile long and that there are few potential users that live close to the trailhead at either end.
- View that money and other resources necessary for the bridge and path would be better spent on improving Levee Road which would benefit more people. (The reasons given on page 88 of the EIS/EIR for eliminating the alternative of "Routing the Proposed Southern Perimeter Through-Trail over the Green Bridge" strike us as unpersuasive, because even if the concerns stated were raised by local residents, they are inherently not logical. Widening the shoulder of Levee Road would increase, not decrease public safety along that road, and would not generate additional traffic and noise in Point Reyes Station.)

- If the trail improvement and construction of the bridge were proposed on private property or on state or County-owned land, it would violate the County's policies on streamside conservation areas, because there is the reasonable alternative of using Levee Road. While technically exempt from these rules, the Park Service should be held to the same standard.

It seems clear that improving the existing bridge and road would have fewer impacts on the environment than the proposed through-trail and would benefit more people. We intend to initiate a broadly based, community-wide effort, working with county and state agencies, to bring about improvements to the Green Bridge and Levee Road that make them safe for non-motorized transportation.

Mesa Spur Trail (contemplated in Alternative C). As mentioned above, we do not support the Mesa spur trail and overlook (near the duck club) proposed in Alternative C. The Mesa spur is an out-of-the-way location the use of which would be difficult if not impossible to police. If opened to public access, this location could easily turn into an attractive nuisance generating trash and unsanitary conditions, as well as noise and other conflicts with the residential uses above the trail. Vehicular access to the existing road to the duck club should be blocked with a simple gate to prevent illegal dumping of trash etc. The use of the existing utility parking area by local landscaping businesses could be continued under lease if this use is compatible with the wetland restoration in this location. Alternative sites for ADA access are mentioned below.

Trailhead at Green Bridge. We support the proposal to create improved trail access at the Green Bridge. We hope to be included in the planning process for the details of this proposal. We support the blocking off of direct access from the wetland trail to Third Street.

Dairy Overlook; ADA Access. It occurs to us that ADA access to the dairy overlook may be possible via a direct path from C Street (from a point between Fourth and Sixth Streets) if the Park Service retains ownership of its land along C Street or retains a road easement connecting C Street to the park land below. This more direct access from downtown would increase the enjoyment of the overlook by local residents and visitors and, if properly planned, including signage, would avoid the overloading of Third Street which is our major concern. In addition, ADA access could be created at the White House Pool County Park parking lot.

Thank you for considering our comments.

Respectfully submitted by

Wiebke Buxbaum

Wiebke Buxbaum,
Chairperson of the Design Review Committee

SIERRA CLUB MARIN GROUP

COASTAL SECTION C/O GORDON BENNETT
Box 3058 San Rafael CA 94912 40 Sunnyside Dr Inverness CA94937
sanfranciscobay.sierraclub.org/marin 415-663-1881 gbatmuirb@aol.com

February 12, 2007

Superintendent, Point Reyes National Seashore
1 Bear Valley Road, Point Reyes Station CA 94956

Re: Point Reyes National Seashore (PRNS)
Giacomini Wetland Restoration Project (Project)
Environmental Impact Statement / Report (EIS/R)

The Sierra Club, on behalf of its 7,000 Marin County members, wishes to support Project Alternative D, which the EIS/R identifies as the "Environmentally Preferred Alternative" but modified as follows:

SW corner of East pasture

We suggest that Alternative D might be modified to excavate the SW corner of the East pasture only to the extent that it may enhance the adaptively managed restoration of the Olema Marsh. We acknowledge that returning the entire area to historic conditions is both impractical and futile due to upstream land uses. So we do not support the full excavation as proposed in Alternative D, since it seems that the cost/benefit ratio is high and we believe that the money could be used to more effective purposes (perhaps to purchase adjacent properties for restoration).

Nevertheless, the adaptively managed restoration of Olema Marsh does pose a conundrum since it has high value yet it may be negatively impacted if this SW corner of the East pasture is only "scraped" as Alternative C suggests rather than excavated as in Alternative D. However, the Giacomini Marsh Restoration is due to flood the area before the Olema Marsh project is completed. If there is any chance that a fuller excavation of this area in the SW corner could enhance restoration of Olema Marsh, then the only reasonable time to excavate would be as part of the earlier Giacomini Marsh Restoration.

Thus our request that this area be analyzed for its potential to contribute to the Olema Marsh Restoration and excavated in advance on the expectation that a full restoration of Olema Marsh will be possible and to the extent that such excavation would materially contribute to the Olema Marsh Restoration.

Tomasini Creek

We also support the full restoration of Tomasini Creek as proposed in Alternative D but again we question the cost/benefit ratio of moving a creek into its historic channel when that is likely to happen on its own. This money might be better spent on more wetland restoration rather than historic channel restoration.

Furthermore, another major expense in the larger culvert. In all other cases, we would likely support a larger culvert that would allow a more natural and fuller connection between flows upstream of the culvert and those downstream. In this case, however, we have upstream the former West Marin Landfill, whose inevitable failure will discharge leachate into Tomasini Creek. From this perspective, a smaller culvert may trap some of the high flows behind the culvert where they may drop out instead of being conveyed directly to the Giacomini Marsh with high flows that a large culvert might enable.

In summary, the former landfill strongly suggests the benefit of as much wetland as possible in the Tomasini "Triangle" and upstream, where more extensive Tomasini wetlands can filter out toxics as much as possible before they enter the Giacomini wetlands or are conveyed directly into Tomales Bay.

Access Points

The Sierra Club supports Alternative D's elimination of the Mesa spur trail / viewing area (near the hunting lodge) as proposed in Alternative C. We believe this would create an attractive nuisance that would conflict with nearby residences above the trail, as well as needlessly impact wildlife. We support Alternative D's proposed Dairy Overlook (modified to be ADA compliant) via a direct path from C Street, which we believe could avoid both wildlife impacts and traffic impact to Third Street.

We also suggest that Alternative D be modified to eliminate the proposed spur trail extending from Railroad Point south on the Right of Way (RoW). In the opinion of the Sierra Club, by a pathway on the RoW, which runs through sensitive riparian/ wetland areas, would clearly impact restoration values. The Sierra Club has previously defended this Mesa buffer from incursion by the Writers Refuge Cabins. However, we acknowledge the desirability of pathway access from the town of Point Reyes Station to the Martinelli tract without having to walk along Highway One. Per our 2/23/04 scoping letter, we request the PRNS send a letter to property owners along the south boundary of the NPS tract and ask if there might be any willing to sell an access easement. We also ask PRNS to construct a gate at the SE corner of the NPs tract that would halve the distance now required to walk next to Highway One.

Hunting

While we support the public's opportunities to hunt, we are concerned about the hunting currently allowed on State Lands Commission property immediately to the north of the Project Boundary. Once the north levee is removed, there will be no easy way for hunters to determine the boundary between State Lands (where hunting is allowed) and NPS lands (where hunting on or firing into is prohibited). Furthermore, we suggest that allowing hunting adjacent to the residences of Inverness is increasingly inappropriate. We would suggest instead that the hunting area be moved north of the town of Inverness, perhaps as far as Walker Creek, to provide a reasonable buffer.

Small Tributaries

The Restoration emphasizes enhancing the connectivity of the major tributaries (Tomasini, Olema, Bear Valley) but numerous smaller creeks also flow into the restoration area. Many of these creeks, particularly those on the west side of the Restoration that pass under Sir Francis Drake, are culverted. The Sierra Club urges that the scope of the Project be expanded and funds set aside for opportunistic replacement of these culverts to enhance biological and hydrological connectivity.

Summary

The Sierra Club congratulates PRNS on an overall well designed Project. With few exceptions, as noted in our four comment letters, we concur regarding the importance of the Restoration and look forward to its completion.

Thank you for the opportunity to comment on the Giacomini Marsh Project and please also see our three associated Project letters.

Gordon Bennett, Sierra Club Marin Group Conservation Chair

SIERRA CLUB MARIN GROUP

COASTAL SECTION C/O GORDON BENNETT
Box 3058 San Rafael CA 94912 40 Sunnyside Dr Inverness CA94937
sanfranciscobay.sierraclub.org/marin 415-663-1881 gbatmuirb@aol.com

SIERRA CLUB
FOUNDED 1892

February 12, 2007

Superintendent, Point Reyes National Seashore
1 Bear Valley Road, Point Reyes Station CA 94956

Marin County Parks and Open Space District (MCP&OSD)
Attn: Sharon McNamee
3501 Civic Center Drive, San Rafael, CA 94903

Wildlife Conservation Board,
Attn: John P. Donnelly
1807 13th St Suite 103
Sacramento, CA 95814

Re: Point Reyes National Seashore (PRNS)
Giacomini Wetland Restoration Project (Project)
Environmental Impact Statement / Report (EIS/R)

The Sierra Club, on behalf of its 7,000 Marin County members urges PRNS, MCP&OSD and the California Wildlife Conservation Board to establish a more cooperative plan to benefit the public, the wildlife and the Project.

Olema Marsh

The DEIR/S page 86 notes that the construction of a causeway across the mouth of Olema Marsh to increase hydrological connectivity with the Giacomini Marsh was considered infeasible because the MCP&OSD *"had concerns about losing some of the values of the existing park."* However, there is no indication that the Wildlife Conservation Board, the owner of this property, was involved in the planning. We would assume that if the causeway would contribute to wildlife conservation, as the Sierra Club believes, then the Wildlife Conservation Board should be willing to allow its land, currently a filled wetland, to be restored. We believe that restoration could be accomplished without losing any value or use of the existing park. PRNS has indicated that the causeway would not impact the parking area, so it would seem that the primary park element that would change if

a causeway were constructed would be a new pathway over a restored wetland replacing the existing pathway over the filled wetland. Furthermore, this decision by the MCOSD appears to have had a material impact on the design of the Project yet, to our knowledge, was never discussed in any public venue. The public should have an opportunity to weigh in on this important matter. In summary, we urge that the causeway and the Wildlife Conservation Board land remain in play as viable options if the adaptively managed restoration of Olema Marsh determines that they would increase or facilitate the Project's restoration goals.

Viewing Areas

The Sierra Club also desires to keep cumulative impacts from existing and proposed County and NPS viewing sites to no more than exist now along the southern edge of the Project. We have no problem with the two viewing areas proposed by PRNS at the east and west corners of the north end of the Restoration (Drakes View Drive and Railroad Grade). However, the existing MCP&OSD parks on the south side of the Restoration already contain approximately eight viewing areas. In addition along this southern edge, PRNS proposes and we support the viewing area at C Street in Point Reyes Station.

The Sierra Club urges that the southern perimeter trail be routed across the Green Bridge instead of across a new bridge at the site of the former dam, but regardless of which route is ultimately chosen, this trail will result in increased impacts from existing viewing sites. If the new bridge is installed (which we urge it not be), then the bridge itself will become a de-facto new viewing area with significant adverse impacts on wildlife. We also believe that new nationally advertised NPS viewing sites/trail will get significantly more use than the existing county sites. Thus even if PRNS does not add any new "viewing sites", we believe the increased impact of the existing County Park sites will be an unacceptable impact on wildlife. These potentially adverse cumulative impacts were inadequately studied by the DEIS/R.

Thus we call on MCP&OSD to recognize the increased impacts from their viewing areas as a result of the PRNS Project and to work with PRNS to establish a coherent set of viewing areas along the southern edge of the Project. We further suggest that a reasonable outcome may be that the number of County viewing areas should be halved. The four County sites to be removed would be restored and the four County sites remaining would be improved so that viewing areas' signage and amenities would be generally consistent along this southern perimeter path regardless of agency jurisdiction and regardless of the ultimate routing of the perimeter trail

Trails

Regardless of where the perimeter trail is ultimately routed, existing trail segments in the County Parks are roughly 4 feet wide and unimproved. We would urge that this width not be increased in this sensitive area, but we do request that the County consider adding decomposed granite (with pine resin binder) on its segments so that they are consistent with PRNS trail segments in the same area. Likewise we request that the County and PRNS cooperate to make signage, maintenance and rules (e.g. dogs on leash) along all trail segments generally consistent along this southern edge. We urge that the County designate its official trails either vegetatively or with split-rail type fencing (as PRNS proposes to do on its portions) to encourage users to stay on trails through areas that the PRNS Restoration will make significantly more sensitive. We ask the County to then close off and restore the remaining social trails on Wildlife Board land so that these areas become an integral part of the wildlife restoration by channeling human and dog use onto officially designated trails. Again, we find this DIES/R deficient in assessing the cumulative impacts from the Project on existing County trail segments. Lastly, the Sierra Club supports the PRNS proposal to create improved access to the eastern County trail segment from the Green Bridge rather than from Third Street in Point Reyes Station.

In summary, the Sierra Club believes that the DIES/R does not study nor encourage better coordination between PRNS, MCP&OSD and the California Wildlife Conservation Board and we thus urge that cooperative planning take place as soon as possible.

Thank you for the opportunity to comment on the Giacomini Marsh Project and please also see our three associated Project letters

Gordon Bennett, Sierra Club Marin Group Conservation Chair

Don Neubacher
02/14/2007 03:27 PM
PST

To: Ann Nelson/PORE/NPS@NPS
cc:
Subject: Sierra Club Giacomini comments

Don Neubacher
Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956

415-464-5101 (office)
415-233-0303 (cell)
415-663-8132 (fax)

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

----- Forwarded by Don Neubacher/PORE/NPS on 02/14/2007 03:27 PM -----

gbatmuirb@aol.com
02/14/2007 05:53 PM
EST

To: don_neubacher@nps.gov
cc:
Subject: Sierra Club Giacomini comments

Check out the new AOL. Most comprehensive set of free safety and security tools, free access to millions of high-quality videos from across the web, free AOL Mail and more.

07-02-SCMGtoPRNSreGiacominiDEIS.doc

SIERRA CLUB MARIN GROUP

COASTAL SECTION C/O GORDON BENNETT
Box 3058 San Rafael CA 94912 40 Sunnyside Dr Inverness CA94937
sanfranciscobay.sierraclub.org/marin 415-663-1881 gbatmuirb@aol.com

February 12, 2007

Superintendent, Point Reyes National Seashore
1 Bear Valley Road, Point Reyes Station CA 94956

Marin County Department of Public Works Attn: Farhad Mansourian
3501 Civic Center Drive, San Rafael, CA 94903

Re: Point Reyes National Seashore (PRNS)
Giacomini Wetland Restoration Project (Project)
Environmental Impact Statement / Report (EIS/R)

The Sierra Club, on behalf of its 7,000 Marin County members, opposes locating the Project's perimeter path through the SE corner of the Project.

We do however continue to support the concept of a proposed perimeter pathway as described by the Dona Larkin of Community Pathways Committee: *"a non-motorized off-street path running parallel to Sir Francis Drake Blvd. along the perimeter of the Giacomini Wetland Restoration Project to its northern border near Drakes View Drive. We also believe that the County of Marin can assist in providing the roadside portions of the path for public safety and safe routes to school. We envision a perimeter path, six feet wide where possible, constructed of a durable erosion-resistant, permeable surface such as decomposed granite with pine resin binder. We understand that there are significant challenges to constructing such a path. It would at times have to run on the Giacomini property, and at times along the roadway which would then of course require a safe yet aesthetically pleasing barrier between users and passing cars."*

We also have co-signed a letter with the Marin County Bicycle Coalition, the Community Pathways Committee, Access4Biikes, and Transportation Alternative for Marin that calls for prioritization of funding for this pathway and a memorandum of understanding between PRNS and the County of Marin for its design, construction and maintenance. However, we believe the proposed location at the site of the former dam resulted from a lack of coordination between PRNS and the County, rather than being the best transportation / restoration solution. We continue to urge, per our prior scoping letter, that the perimeter path be routed across the Green Bridge and then along Levee Road. However, the DEIR/S (pg 88) notes *"this alignment raised substantial concerns from local residents regarding public safety along Levee Road, which is one of the main County*

thoroughfares in this area, and impacts from noise and traffic to landowners on Levee Road and in the town of Point Reyes Station." Contradicting these concerns, however, is the certainty that Levee Road (and Sir Francis Drake through to Drakes View Drive) will be redesigned to include bike paths and safely improvements on both sides as are currently proposed for Sir Francis Drake through SP Taylor Park. While these improvements to the Levee Road/ Drakes View Drive section will not be easy, they will be significantly more so than those planned through SP Taylor Park. Thus the issues of public safety, noise and traffic along Levee Road must and will be successfully addressed regardless of whether or not the perimeter path proposed is routed across the former dam site.

In fact, the Alternative C proposal will ultimately result in noise and traffic on both sides of the landowners on Levee Road, as local pedestrians will use the Alternative C path and road bikers will use bike lanes on Levee Road. Also, people leaving or visiting these properties will still have to travel along Levee Road. Users of the proposed perimeter path will also have to use Levee Road when the path through the Restoration is flooded, as the DEIS/R notes will regularly occur.

The cost to the taxpayer of the proposed bridge at the dam site through the corner of the Project is significant. Yet, as noted above, this proposed location would become duplicative when the Levee Road bicycle improvements occur. As noted in our concurrent comment letter to Marin County Open Space District, the Sierra Club would not support widening the path through the MCP&OSD Park beyond the roughly 4 feet that exist now due to impacts to the sensitive adjacent habitat. Thus the Alternative C path constructed with the bridge across the former dam site will be suitable as a "community path" but cannot (and should not) be part of the non-motorized transportation network, as would paved bike paths along Levee Road.

We believe these two projects (the PRNS perimeter path and Levee Road bike paths) should be planned together and sited together rather than separately. The bridge proposed at the former dam site seems like a costly substitute for cooperative planning between PRNS and DPW. The public should not bear the burden of additionally paying for (nor should the marsh bear the burden of being additionally impacted by) this bridge simply because two responsible agencies (PRNS and DPW) have not been able to coordinate their project and funding schedules. In summary, PRNS should move its proposed bridge funding to improve the Green Bridge bike and pedestrian access as part of a cooperative planning with DPW. Both agencies should work to create a multi-use pathway that connects Point Reyes with Inverness Park largely along the existing road right-of-way as proposed in the West Marin Pathways plan.

Thank you for the opportunity to comment on the Giacomini Marsh Project and please also see our three associated Project letters.

Gordon Bennett, Sierra Club Marin Group Conservation Chair

SIERRA CLUB MARIN GROUP

COASTAL SECTION C/O GORDON BENNETT
Box 3058 San Rafael CA 94912 40 Sunnyside Dr Inverness CA94937
sanfranciscobay.sierraclub.org/marin 415-663-1881 gbatmuirb@aol.com

February 12, 2007

Superintendent, Point Reyes National Seashore
1 Bear Valley Road, Point Reyes Station CA 94956

North Marin Water District (NMWD)
Attn: Chris DeGabriele, NMWD Board
PO Box 146 Novato, CA 94948-0146

Re: Point Reyes National Seashore (PRNS)
Giacomini Wetland Restoration Project (Project)
Environmental Impact Statement / Report (EIS/R)

The Sierra Club, on behalf of its 7,000 Marin County members, urges NMWD to adopt the Department of Health Services (DHS) recommended "maximum contaminant level"(MCL) for chlorine as 250 mg/L as the constraint for the PRNS proposed adaptive management of the Olema Marsh Restoration.

The DEIS/R notes that a key constraint for restoration of Olema Marsh is the potential that it may result in increased chlorine in the NMWD water that supplies PRNS as well as the communities of Point Reyes Station, Olema, and Inverness Park. This chlorine comes from high tides whose access to the well site may be facilitated by the Olema Marsh Restoration. The Sierra Club certainly does not want to trade off the health of these human communities for the health of the Restoration. However, the DEIS/R (pg 304) notes that DHS has set the recommended MCL of 250mg/L *"primarily for aesthetic reasons"*; the upper MCL is 500 mg/L. Regardless, NMWD has established a limit of only 100 mg/L of chlorine as its taste and odor threshold.

We have no problem with NMWD establishing whatsoever limit it cares to for chlorine. If NMWD chooses a lower chlorine limit in excess of caution and as a result incurs additional operational costs to maintain that lower limit, then that is an issue for its ratepayers. However, when that lower limit triggers adverse environmental impacts, then it does become the concern of the Sierra Club.

The Sierra Club and NMWD had had this same discussion once before in negotiations regarding the transfer of location and use of the Giacomini water

rights. In that discussion, we expressed concern that MMWD's 100 mg/L limit might trigger the apparent need for NMWD to protect its water supply from saline intrusion by erecting a dame across Lagunitas Creek. The State Water Board's WR-95-17 ruling specified the adverse impacts on endangered species (shrimp, salmon) of such a dam. Nevertheless, NMWD insisted during those negations of its right to protect its water supplies by installing a dam based on its 100mg/L chlorine threshold.

It was, and remains, the Sierra Club's position that a "need" with such negative environmental consequences must be based on a commensurate and scientifically demonstrated human "need." In the opinion of the Sierra Club, such a low 100 mg/L chlorine threshold does not threaten human health. NMWD's 100 mg/L is an extreme aesthetic taste and odor threshold that only some individuals can perceive. Thus NMWD's 100 mg/L chlorine threshold should not mandate actions that have an asymmetric impact on ecosystem health, including both the possible dam across Lagunitas or as a possible constraint on the Olema Marsh Restoration.

If the salt concern at any threshold level becomes an issue in the Olema Marsh Restoration, then PRNS should weigh the value of contributing funds to NMWD's Gallagher well project which would substantially reduce the tidal threat to the water supply and thus mitigate for the adverse impacts of the Restoration.

In summary, the Sierra Club urges that NMWD agree that the appropriate threshold constraint for the Olema Marsh Restoration should be the DHS recommended 250 mg/L for chlorine, not NMWD's current 100 mg/L threshold. To hold back further restoration of Olema Marsh for any lower threshold would be, in our opinion, an asymmetrical and scientifically unjustified constraint.

Thank you for the opportunity to comment on the Giacomini Marsh Project and please also see our three associated Project letters.

Gordon Bennett, Sierra Club Marin Group Conservation Chair

RECEIVED
Point Reyes
FEB 15 '07
SUPT.
USES
LAW ENFORC.
NAT RES
RANGE CONS.
FIRE MGT.
INTERP.
CULT RES.
MAINT
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Tomales Bay Association
P.O. Box 369
Pt. Reyes Station, California 94956

14 February 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956
Park_Planning@nps.gov

Comments on the Giacomini Wetlands Restoration.

Dear Don:

You and your staff have done an excellent overview of options on the proposed wetland restoration plan. As TBA was perhaps the first group out here to strongly encourage the buying and restoration of the former Giacomini Ranch, dedicating an entire issue of our *Tomales Bay Watershed* as a digest of the initial review by Phil Williams and Associates in order to help inform the public, we look forward to the restoration both as it's benefit to species habitat and for educational value for the public.

We strongly urge the Park to implement Alternative C, which we believe is actually the better "preferred environmental alternative" than the stated "environmental alternative" as it calls for somewhat less extensive manipulation of natural processes while giving natural hydrology the opportunity to self-restore, and it also includes the potential for educational viewing areas and allows basic low impact transportation opportunities for non-motorized transportation.

With or without public access, there will clearly be a major increase in habitat for many special status species in the restoration area. Including a fair-weather off road path along the western perimeter of the western pasture will offer the best of all possible worlds, allowing people to view the area in a more controlled way than without a designated path, and make a real alternative to the automobile-dependent Sir Francis Drake Boulevard. The health of the bay and our ecosystem will benefit by decreasing local car trips and increasing the public appreciation of the restoration project.

Considering that the Giacomini's will retain the old duck clubhouse and road to it for at least another 25 year, it makes good sense to have that be an area that the public can feel free to use and monitor activities around the old clubhouse.

We urge implementing Alternative C, with the following emphasis:

1. Make elimination of the northern transecting dike of the western pasture the greatest importance and first activity. (We recognize that lowering the levee near the mouth of Lagunitas Creek at the same may be efficacious, but the transecting dike and destination-flocking by humans is most disruptive for wildlife and we wish to emphasize the importance for its complete removal as a top priority)

2. Build the channel-spanning bridge over Lagunitas Creek as soon as monies become available. We note that those monies will come from a different source than the restoration monies, and encourage you to seek such funding so as to undertake the restoration and development of the trail concomitantly.

3. Emphasize for educational purposes the five major feeder streams into the marsh:: Lagunitas, Bear Valley, Olema, Tomasini, and Fish Hatchery Creeks. Encourage limited public access, allowing for the greatest possible vegetation and associated habitat improvement and minimize informal tramping. Extend western perimeter trail to northern end of property, in conjunction with the County of Marin, to allow basic transportation and promote education regarding the importance of transitional wetlands. (We note that a great number of exiting trails in the park pass over or are within wetland areas. E.g. Muddy Hollow trail, Bear Valley trail, the Estero trails.)

4. Maximize opportunities for having an off-road separation of the trail along Sir Francis Drake Boulevard where feasible, include sections with boardwalks such as found in the Everglades to allow drainage, and continue trail toward Inverness along edge of property, where necessary in cooperation with the County of Marin along the SFD easement, per the recommendations of the 1988 West Marin Pathway Feasibility Study.

5. Consider in the future raising Mesa Road on a causeway rather than digging new alignment for Tomasini Creek. In other words, allow nature to restore itself by removing the obstructions that are currently preventing it, as a modification of option in Alternative D. We have no objections to maintaining the spur trail in that area, as there is an existing road anyway. The spur from Mesa Road will probably be visited most by local residents, although there is no need to advertise it. (We note there have been very few nuisance problems with the remote parking at former Bear Valley Stables site, which allows viewing of the Bear Valley Marsh, AKA Olema Marsh and has a connecting trail to the levee road),

6. Utilize the filled land at corner of B-Street and Hiway One as a parking lot if it becomes available and route the trail to avoid 3rd Street as a main destination. This will help relieve traffic and parking congestion in Point Reyes Station that will get worse regardless of the restoration or trails.

7 We encourage acquiring also the lands on the western pasture that ought to have been included in the original purchase.

The Preferred Alternative has many of the aspects of Alternative D, but in a stronger public educational and pedestrian-friendly form. This alternative meets all the goals of the park service's mission.

We appreciate your diligent work to procure funding to bring this important project to fruition, and your commitment to working with the local population in order to bring about a more healthy, integrated community and ecosystem.

Sincerely,

Kenneth J. Fox

Kenneth J. Fox, President

Individual Comments

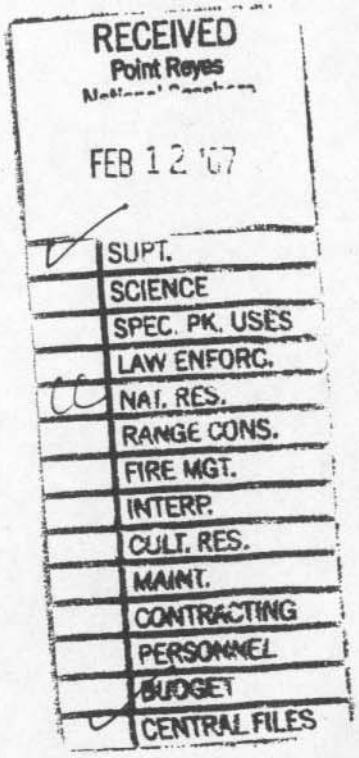
nancy adess
<naedit@horizoncable.com>

02/12/2007 10:37 AM
PST

To: park_planning@nps.gov
cc: John_Jarvis@nps.gov
Subject: Giacomini Wetlands Restoration Plan

Dear People,
I support the Park Service's evaluation of the best alternative for the Wetlands Restoration at Giacomini Marsh: Plan C.

Nancy Adess
Point Reyes Station



"Leslie Adler-Ivanbrook" <leslieai@horizoncable.com>
02/14/2007 11:06 PM PST

To: <Park_Planning@nps.gov>
cc:
Subject: Giacomini Wetland Restoration Project

Leslie Adler-Ivanbrook
12340 Sir Francis Drake Blvd.
Point Reyes Station, CA 94956

Dear Superintendent,

I am writing to comment on the proposed project alternatives for the Giacomini Wetland Restoration described in the DEIS. I would first like to commend the efforts of the Park Service in the preparation of the document, the comprehensive treatment of issues related to benefits and impacts of the project, and of the consideration of community concerns represented in the different Alternatives. Though my preference from an ecological perspective is Alternative D, I would advocate the inclusion of the bridge to connect the north and south trails along Lagunitas Creek, and the same provision for potential trail extension up to Inverness Park as shown in Alternative C. Additional, more specific comments are detailed below.

The current public use of the existing trails at the southern perimeter includes walkers, dog walkers, bikers, and occasional equestrian riders. Of particular concern to me as a dog owner is that those trails are one of the very few places in this locality that owners can take their dogs for a walk off leash, where the dog can run free, meet other dogs, exercise and be happy. I am concerned that as a formal, public pathway operated by the NPS, dogs will no longer be allowed to walk and run off leash. This is a huge quality of life issue for me, and I'm sure, many other dog owners that have been using these paths for years. I also really enjoy the current un-improved character of those pathways. I would advocate allowing the existing trails to continue, but without formal improvement, except for the bridge to connect the N and S paths. My hope is that without formal improvement (interpretive signs, surface preparation, etc.) dog walking routines will be allowed to continue as they have been for many years on this property. I feel this way, the current use and enjoyment of this site by residents with dogs will be protected. If the plan is to continue to allow the current use of the paths, then trail improvement would be acceptable, as long as it is not widened beyond the existing boundaries, and grassy open areas and existing vegetation along the western portion of the path remain intact.

The trail on the north side of Lagunitas Creek connects to town at the current public access site near the Green Bridge. I understand the purpose of this access point is to protect the residents near 3rd Street from increased pedestrian and vehicular traffic. However, there is no safe and easy walkway on Rt. 1 to the public access site from town. There is currently no sidewalk which leads from Main Street or B Street along Rt. 1 to the access point. This is dangerous for pedestrians and bikers, especially for kids and walkers with dogs. Also, it is further from the center of town, which makes the path less accessible for some, particularly the seniors who currently use the trail. I suggest making trail access at 4th Street, and have that be part of the negotiations for the future of the parcel along C Street.

Additionally, I am concerned about the proposed fence along the north side of the trail for two reasons. I believe a fence along a wetland, which is intended to be part of an integrated tidal system, will impede wildlife access across the trail to Lagunitas Creek. Additionally, it could act as a debris trap during flood events, and could impede hydrologic movement. On a personal note, walking along a wetland beside a fence detracts from one's sense of open space and enjoyment of the location. I suggest the installation of a vegetative barrier of native shrubs in place of a fence. Dense but low-lying native shrubs and vegetation will act to deter human and canine crossing and will provide wildlife with protection from disturbance.

Also, I have a question: Will the existing public access trails will be closed during construction, or is there some way to provide some trail access that is safely protected from truck traffic and construction impacts, since construction activities will continue for many months per year, for 2 years or more?

In regards to flooding and changes in hydrologic processes, one concern I have is that the tidal inundation of the west pasture in combination with regular smaller scale storm events, will affect the groundwater elevation and in turn, may reduce the affectiveness of the septic system on the Gradjansky property where I am currently living. What is your assessment of this situation. The leach field backs up to the freshwater wetland at the east side of the property.

In regards to construction impacts on air quality and noise levels at the Gradjansky property, I fear that the BMPs listed will not reduce the impact to the less-than-significant level. Living right next to an access point for construction vehicles, it is the vehicular traffic passing through the access path which also affects air quality. Having experienced a short-term earth-moving project on the Giacomini property this fall, with vehicles passing by regularly for a week or two, I can tell you that it was noisy – particularly the effect of the rumbling vibrations literally felt in the house, and triggering my dog to bark throughout the day as they passed by. And this impact will last for months at a time as construction progresses. To address this, I would like to see construction schedules with the expected number of large-size vehicular trips planned for the access path next to and in back of the property. I also would like to request that construction activities at this location start at 8 am rather than 7 am which is a bit early. To hear rumbling and barking at 7:00 am on a daily basis for extended periods of time will definitely affect our quality of life. Also, a concern that I haven't seen addressed in the DEIS is the potential for air quality impacts related to dust created during dry months by trucks travelling over sandy pathways next to the Gradjansky property. Though the trees will create somewhat of a barrier, suspension of dust in the air can travel toward the house and yard. Would spraying the pathway with water be possible if particulates from the accessway become a problem?

I am also concerned that my and my neighbor's young children and our dog sometimes play on/near the pile of sand north of Fish Hatchery Creek adjacent to the Gradjansky property. I would like construction fencing to be installed securely along the path planned for construction vehicles all the way past the property line to prevent children and dog from entering a potentially dangerous situation.

In terms of the success of the marsh restoration, I advocate as much planting as possible be done to revegetate the marsh after excavation, and also after existing vegetation die-off occurs if new tidally adapted vegetation does not establish itself quickly enough. Restoration projects are most successful at minimizing invasives if native species are planted before non-native varieties have a chance to colonize.

Thank you for considering these comments. (I might have had more if I had time to get through the whole document.) I look forward to your reply.

Sincerely,

Leslie Adler-Ivanbrook

"Leslie Adler-Ivanbrook" <leslieai@horizoncable.com>
02/15/2007 02:24 PM PST

To: <Park_Planning@nps.gov>
cc:
Subject: Giacomini Wetland Restoration comments

Dear Superintendent,

This is an addendum to my email I sent in last night. Here are a couple of points I forgot to include:

In the Alternatives B-D, the potential for the construction of a low berm in the west portion of the West Pasture was noted to protect the private properties. This idea was not noted in the maps, so I am curious as to what would trigger the implementation of this idea. Is funding included in the plan for that and what would the berm look like (ie location, elevation, will there be outlet possibilities for drainage from the ridge, etc). If it would help to protect the existing freshwater marsh vegetation and trees on site, it might be worth looking at. The trees provide perching areas for many birds (predatory, vultures of course, song birds and I have also seen great blue herons occasionally using the trees for a perch). They also act as a bit of a wind break for the property.

Also, on the map for Alternative D, in the west, what is the purpose of installing a "fence to limit cattle access" extending west-east to the creek if cattle will no longer be grazing on the pastures with this alternative? Is that a typo?

Thank you again, for your consideration of these and prior comments.

Sincerely,

Leslie Adler-Ivanbrook
12340 Sir Francis Drake Boulevard
Point Reyes Station, CA 94956
415-663-8669

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting
January 25, 2007

Please add any additional issues that were not brought up at this meeting:

As a tenant in the Gradjunsky house, could we get truck schedules for when they access the wetland along the property, and could there be a plan for temporary fencing on the north side of the pile of sand since my kids like to dig there. Safety issue. Thanks!

Feb.8,2007

Superintendent,
Point Reyes National Seashore
Dear Superintendent:

I'm both a resident of Point Reyes Station and an environmentalist On both counts I would ask you to support Plan D ,and not Plan C, in the Giacomini Wetlands Restoration project.

I feel Plan C will increase noise, traffic and congestion in residential areas; I'm particularily concerned about the proposed parking lot site on Mesa Road. This site could be a marvelous "transition " zone for wildlife,and encourage Black Rails, Tidewater Gobies, and Red-legged Frogs to make a comeback. Coho salmon would also benefiti this site is the mouth of Tomasini Creek,and a transition zone here would enrich the wetlands immensely. Please continue your wonderful support for wildlife,and reject Plan C.

In my view, there are already access points available: White House Pool and Tomales Bay Trail are existing sites with parking lots, and Olema Marsh could easily be made ADA compliant.

I feel we need maximum restoration,more salmon,and less parking lots.

Sincerely,

Ellery Akers
P.O. Box 1267
Pt. Reyes Station
Ca. 94956

RECEIVED
Point Reyes
FEB 9 - '07

✓	SUPT.
	SCIENCE
	SPEC. PK. USES
cc	LAW ENFORC.
	NAT. RES.
	RANGE CONS.
	FIRE MGT.
	INTERP.
	CULT. RES.
	MAINT.
	CONTRACTING
	PERSONNEL
	BUDGET
✓	CENTRAL FILES

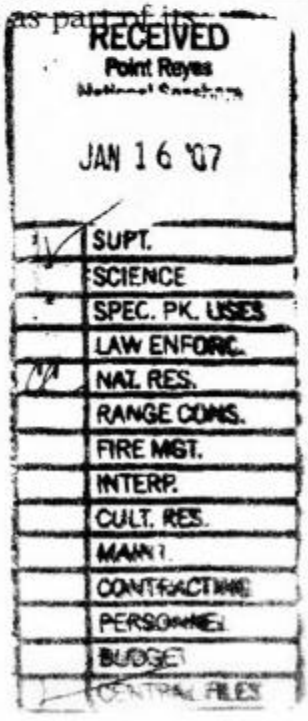
Point Reyes Station
Jan. 15, 2007

Dear Don and Lorraine,

I would like to say that I concur completely with Hathaway Barry's letter being sent to you regarding the Wetlands. That being said, I have other concerns to which I would like response, and I understand there will be no public input on the 25th. That may be just as well, considering the strong feelings in the community and the rift it has generated.

Is there a difference in the missions of a public park and wetlands? I thought that preservation and restoration for the future was the main aim of wetlands, and public access and public good was the main aim of a park. As Hathaway Barry notes in her letter, there are 72,000 acres nearby for public use.

My understanding is that the "Lodge" will remain in Giacomini custody for 25 years. If that is the case, and a public path goes right by it, who is responsible for law enforcement? Until now, the occupancy of the trailers would have discouraged strangers. Will the Park Service have regular inspections and checks? Will there be assurance of funding for this security until the "lodge" is no longer there? Who will be responsible for liability insurance for what takes place in the deserted lodge and its surroundings? Many years ago my niece, with our permission, camped on our property. She started to walk up the path and was chased off by Giacomini. She wasn't even making noise, and surely noise affects creatures as it affects humans. There is a current book in fact about effects of noise in our modern environment. Did Giacomini care for his cows? Does the Park Service care for the wetlands wildlife as part of its preservation?



Sincerely
Doris Allen

Doris Allen
P.O. Box 610
Point Reyes Station
California 94956custer@svn.net

Doris Allen
<custer101@gmail.com
>

01/26/2007 04:37 PM
PST

To: Park_Planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: Giacomini Wetlands

Dear Don or Lorraine,

Thank you for the meeting last night. I found it informative and was relieved that it was not as unpleasant as one of our prior meetings. I had been sort of dreading it. I think all of you helped to set the tone.

As you know, I am firmly for Alternative D, DDDD! -- the environmentally preferred alternative. I see no reason to go against park tradition in not preferring the environmentally preferred alternative, and I certainly felt the sense of the group gathered at the meeting last night felt the same way. I was impressed by the knowledgeable questions and comments, also.

I feel that the difference between access (immediate gratification) and preservation/restoration (a legacy for the future) is striking.

"And this, our life, exempt from public haunt, finds tongues in trees, books
in the running brooks, sermons in stones, and good in everything"

--Wm. Shakespeare.

Because public input is important to the decision, I will correspond as I think of new input. Thanks again.

Doris Allen

RECEIVED
Point Reyes
JAN 29 07
SUPT.
SCIENCE
SPEC PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Point Reyes Station
Feb. 7, 2007

Superintendent Don Neubacher
Giacomini Wetlands Restoration DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

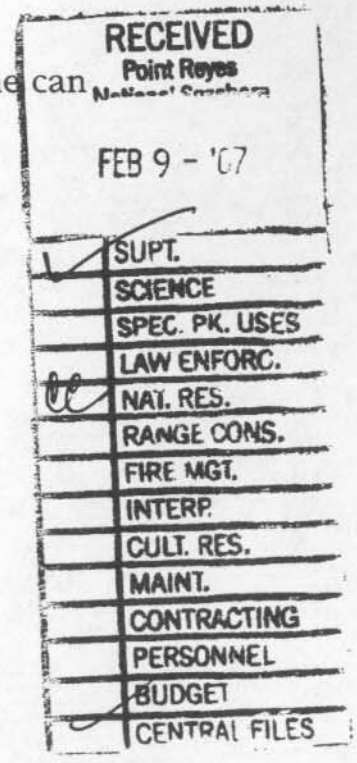
Re: Giacomini Wetlands Restoration Project

Dear Don and Lorraine,

I am writing once more to support Alternative D. It occurred to me that some of the opponents are familiar with the public paths through private property in England ("that happy isle"), but this is very different. There is a long culture there of sharing the private lands for hikers, and one doesn't hear of that tradition being abused. This land,however, is public land which is being restored as a natural wetland for posterity.

I do not anticipate hiking on many trails. At this point the earthquake trail is about my capacity. I do care very much, however, about posterity and the little bit of wildness available for future generations of man and beast, as well as the health of the bay.

In *Walden* , Thoreau said
"A man is rich in proportion to the number of things he can afford to let alone".
I think we can let these small wetlands be wetlands.



Sincerely

Doris Allen

Doris Allen
P.O. Box 610
Point Reyes Station, California
94956

custer@svn.net

cc Jon Jarvis

RECEIVED
Point Reyes
National Seashore
FEB 12 '07

- SUPT.
- SCIENCE
- SPEC. PK. USES
- LAW ENFORC.
- NAT. RES.
- RANGE CONS.
- FIRE MGT.
- INTERP.
- CULT. RES.
- MAINT.
- CONTRACTING
- PERSONNEL
- BUDGET
- CENTRAL FILES

Superintent Neubacher,

Please support the Environmentally Preferred Alternative D.

"I never saw a moor
I never saw the sea
Yet I know how the heather looks
And what a wave must be."
- Emily Dickinson

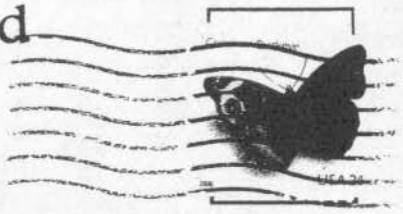
Mankind does not need
to experience everything
Poet's and scientists
can do that for me.

Preserve
Reserve
Restore

Thank you all

Doris Allen
Box 610
Pt. Reyes Sta. CA
94956

Postcard



FEB 9
2007

Superintendent Neubacher
Pt. Reyes Natl Seashore
Pt. Reyes CA
94956

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Superintendent Neubacher 2/12 Postcard

Congratulations on your $1 million grant from the National Coastal Wetlands Program.

I hope the restoration dollars will help move a decision to choose Alternative D.

"Only by keeping our distance from wilderness - some wilderness, at least, can we keep from fouling the wellspring of our own life" - Evan Eisenberg, The Ecology of Eden.

Thanks for all you have done!

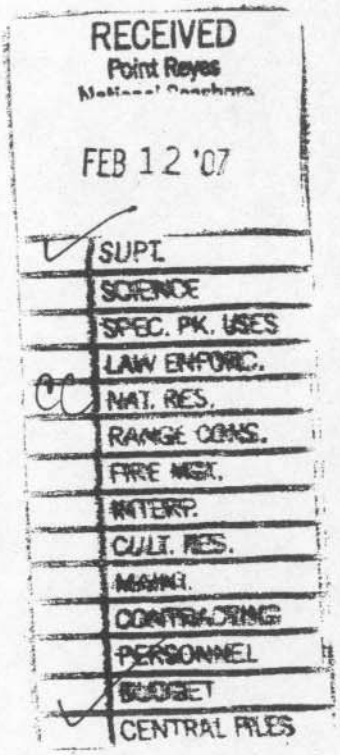
Doris Allen
Box 610
Pt. Reyes Sta. CA
94956

Superintendent Neubacher
Pt. Reyes National Seashore
Pt. Reyes CA
94956

Francine Allen
<fa@horizoncable.com
>

02/11/2007 09:27 PM
PST

To: Park_Planning@nps.gov
cc:
Subject: Giacomini Wetlands Restoration



I urge the Park to implement Alternative D.

Thank you for considering my endorsement.

Francine Allen

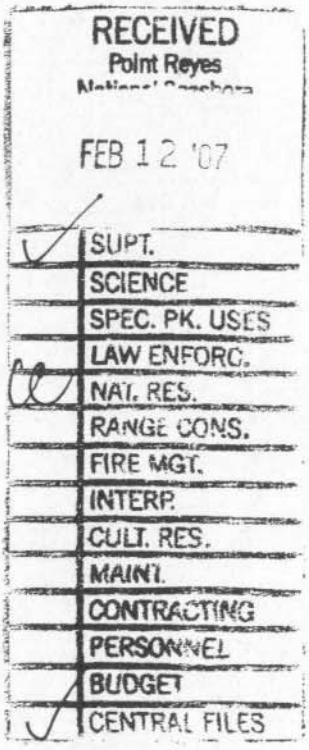
"Sonja Anderson" <SonjaAnderson@iscweb.com>

02/11/2007 02:35 PM PST

To: <pore_planning@nps.gov>
cc:
Subject: Giacomini Restoration

Superintendent Don Neubacher,
I am a resident of Inverness and I would like the Park to implement Plan D reather than C. I would like to include the bridge and trail between Green Bridge and White House Pool but not the other public access that is included on alternative C. At a later time access from the Bay trail and the railroad bed should be discussed and considered, not at this time

Thank you,
Sonja Anderson



SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

My name is Ann
Woodward Ashe
Envelope !

Ann Ashe
POB 1463
Pt. Reyes Sta.

February 12, 2007

Superintendent
Point Reyes National Seashore
Point Reyes, California

Dear Don,
With this letter we again want to express our opinion relative to the Giacomini Restoration Plan. We feel that "Alternative D' provides the best 'beginning' for the wetlands. The natural processes will take some time to get established. Access for people seems a bit premature. Lets wait a few years, then look at this issue again.

Thank you for your concideration.

Norma and Gordon Ashby

Ashby, Box 550
Inverness, CA 94937

RECEIVED
Point Reyes
National Seashore
FEB 14 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Harriet Barlow
<hbarlow@earthlink.net
>

02/12/2007 06:07 PM
PST

To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: Tomales Bay restoration and access

Dear excellent public servants at the Park Service,

May I say first that I am deeply grateful for the work you do in service to the Commons and to the present and future health of the parks and environs in this region and nationally.

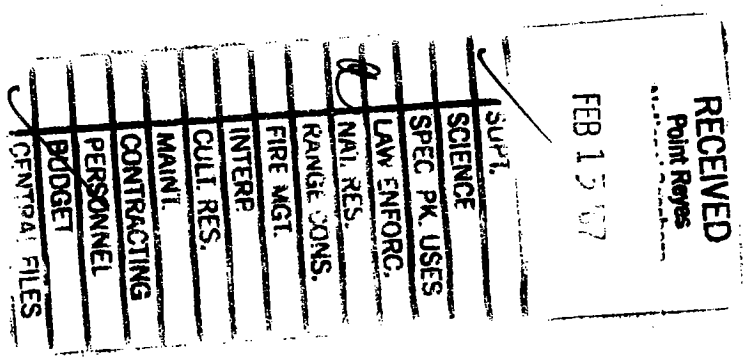
I am a home owner in Pt Reyes (Los Reyes Drive). Full disclosure re: self-interest requires that I admit that my own life-style will be disadvantaged by your plans for "access" to the Bay. I walk, as do hundreds of my neighbors, from and to town on Mesa Rd. As you are aware, there is no side-walk to protect me or other walkers, their children and their pets, from the dangers of increased traffic if the parking lot is installed. As you realize, but I must include it here, there is already access at Martinelli Open Space, Olema Marsh and White House pool, away from town and residential areas.

But aside from my personal concerns, I believe that the determination that the Park Service made to restore the hydrologic and ecologic functions of the Bay were entirely legitimate and DID NOT include increasing human interaction with the Bay. We certainly don't want another situation such as that which required the closing of the salmon watching site in Lagunitas.

Of course I would be pleased to discuss this with you in person or to contribute in any way to a constructive conversation about this issue. Having spent many decades working on protecting the Adirondack Park from overuse (a constant struggle which is only held in balance by increasing the amount of acreage that is protected from human overuse) I know how contentious these decisions can be. Given that the original purpose of the restoration was for the health of the bay, let's stick to that goal. There are plenty of opportunities for people to enjoy the bay from other existing facilities and trails.

Thanks for taking my concerns into account.

Harriet S. Barlow



Peter Barnes
<peter@tomales.org>
02/12/2007 08:35 PM
PST

To: <park_planning@nps.gov>
cc:
Subject: Giacomini Wetlands Restoration

Dear Don

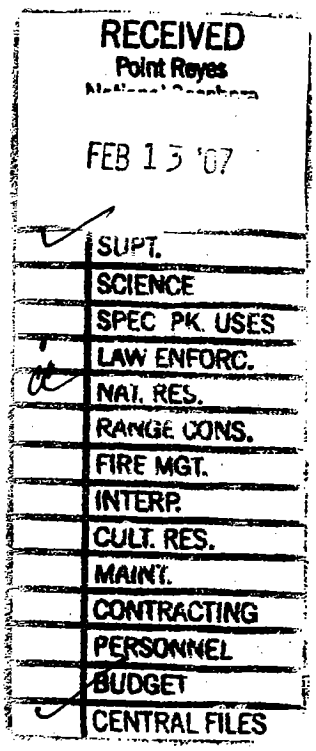
I am writing to say that I support Alternative D with no southern perimeter path.

Congratulations for getting the money together for the restoration.

Regards

Peter Barnes

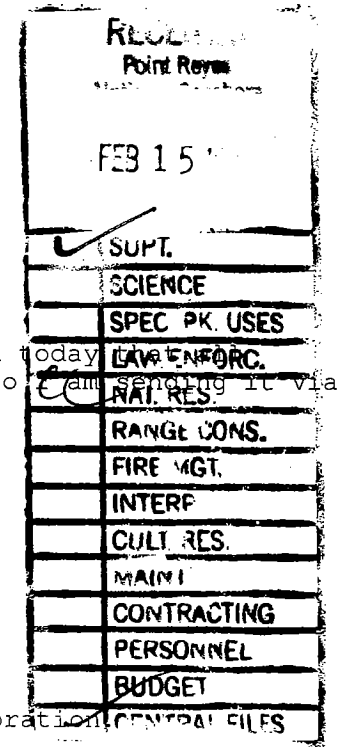
PO Box 237
Point Reyes Station



Coeylen Barry
<co_barry@yahoo.com
>

To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: In put on wetlands

02/14/2007 02:05 PM
PST



Dear Don Neubacher,
I sent the following letter yesterday but then realized today the comments need to be submitted by this evening at 5:00 so I am sending it via email as well

thank you
Coeylen Barry

February 13, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Comments on the Draft EIR: Giacomini Wetlands Restoration

Dear Don Neubacher,

I would like to register my strong support for Alternative D.

As a Masters degree candidate in Environmental Studies, I am very focused on what best serves the environment. I also have a Masters in Education and I have been working to combine the two disciplines [in my life] to contribute in whatever way I can to increasing awareness about taking care of this planet. The wetlands restoration seems like just such an opportunity.

To this end, it seems to me that there is no choice but to go with the "environmentally preferred" alternative D. I would like to see the wetlands restoration proceed unimpeded by human access. This would be a model of restoration, exemplifying the urgency of putting the hydrological and ecological health of the bay first. This would provide a great example for future projects.

There are already plenty of public access and observation sites for our local wetlands.

I love Tomales Bay and, having grown up here and watched the water quality deteriorate, I would like to do anything possible to restore its natural function.

I support you to do whatever it takes to facilitate the free flowing of Lagunitas and Tomasini Creeks into Tomales Bay!

Thank you for your amazing work.

Sincerely,

Coeylen Barry
p.o. box 157
Pt. Reyes, Ca.

RECEIVED
Point Reyes
FEB 14 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE COMS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Hathaway Barry

Point R 956

February 13, 2007

Superintendent
Pt. Reyes Natl. Seashore
1 Bear Valley Rd.
Pt. Reyes, Ca. 94956

Dear Don and Lorraine,

First, I would like to thank you both. It is ever more clear to me what a monumental effort this Wetlands Restoration Project is and I appreciate your excellent leadership and also, Lorraine, the beautiful way you led the public meeting (1/25/07). It certainly appears that there is less divisiveness in the community than there was at earlier meetings. I'm glad for this. May it extend to the implementation of the final restoration plan!

As you know, I am wildly in favor of Alternative D, the "environmentally preferred" option . Alternative C, the Park's "preferred alternative", increases public access thereby compromising the environmental goals. This will draw a lot more people into Point Reyes Station, which will create more noise, traffic, and congestion. I'm concerned for the long-term impact on the bay, the wildlife and their habitat, and the community of us who are trying to live respectfully nearby. Any increased human activity will detract from what I understood to be the original intention of the project - the fullest restoration of the wetlands and the hydrological activity of the once pristine bay. I would like to see Lagunitas and Tomasini Creeks allowed to flow freely, unimpeded by human activity or bridges. Who knows what creatures might take up residence?!

Since the earlier public meetings, Al Gore's film "An Inconvenient Truth" has come out and highlighted the urgency for maximum restoration possible, wherever and whenever possible. Noticing what's already here - 8 existing observation sites - I'm inclined to feel that's enough. Especially if no one's clamoring for more. Access already exists at White House Pool, Martinelli Open Space, and Olema Marsh (could easily be made ADA compliant) - all with parking, multiple observation points, and trails to enjoy. All are 1) away from town and residential areas 2) already existing and 3) require minimal financial output. I would prefer that the money go towards full restoration.

As for the proposed spur trail, I would suggest putting up a large ranch gate at the entrance on Mesa Rd. and leaving it to the wildlife. By the time the Giacomini's lease on the hunt shack is up, global warming and/or an earthquake may well have put the old railroad bed underwater anyway, and on its way back to riparian habitat! In addition to being a serious fire hazard, a policing nightmare (vandalism & noise), a teen hang out and all around attractive nuisance, the trail would be an invasion of the habitat of the residents – human and wild (especially the endangered Tidewater Goby). As Lorraine said at the Feb. 25th meeting, in response to why the southern trail didn't continue north from White House Pool to Inverness - "that would be looking into the people's back yards". Surely that is the case on the proposed east side spur trail, too.

A couple of examples that have stimulated my concern:

* In Lagunitas, the spur trail off of Sir Francis Drake created to view salmon has been so misused that it has now been closed off, except for a few months of the year.

* A cover story of the Marin IJ (5/9/05) read "Rare Frog Imperiled By Humans" because visitors to a waterfall on Mt. Tam had inadvertently become a threat to the very endangered species they were trying to protect. The article went on to say that the visitors (and their dogs) to a waterfall on Mt. Tam watershed were "accidentally crushing egg masses and disturbing mating habits." "The eggs from the frogs – federally listed as a species of concern – already face predation from California newts and non-native bullfrogs. ... And now people are the concern." ... The frogs are feeling the pressure of being in a heavily recreated area," said the natural resource specialist with the Water District. "We want people to have a connection with nature, but sometimes there is too much of a connection."

When I heard/read these things I wondered – might this be a headline about the proposed Tomales Bay Wetlands a few years down the road? And, with foresight, might we as a community avoid creating this situation, by remembering that what is for us a desire, is, for the wildlife, home.

I appreciate the very real safety issues of Levee Rd. And perhaps these issues (of traffic and speed) can be better solved by the county, rather than the wetlands.

In summary, I'm trusting the expert hydrologists, biologists, ecologists, (and all the other "ologists") and engineers who have worked so hard on this Draft EIR/EIS and concluded (as has the EAC, The Sierra Club, The Audubon Society, The Marin Conservation Group) that the environmentally responsible alternative is Alternative D. The benefit of the restoration for people is naturally secondary to that of the wetlands.

Thank you for all of your hard work!

with gratitude,

Hathaway Barry

Hathaway Barry
Pt. Reyes Station

cc: jon_jarvis@nps.gov

Hathaway Barry
<hath@horizoncable.com>
01/22/2007 12:40 PM
PST

To: park_planning@nps.gov
cc: jonjarvis@nps.gov
Subject: re Giacomini Wetlands Restoration Plan

January 21, 2007

Superintendent

Pt. Reyes Natl. Seashore
1 Bear Valley Rd.
Pt. Reyes Sta., CA 94956

Dear Don and Lorraine,

We recognize and respect the desire for public access to the proposed Giacomini Wetlands. However, we feel these desires can be met in a way that does not set a **precedent** by significantly altering the quality of life for current residents (as none of the other proposed paths would), and are therefore opposed to the proposed "spur trail" on the southeastern perimeter. There are some factors which likely only those who live here are aware of and which we feel are essential to include in a complete EIR, so we feel obliged to share them with you.

As neighbors who would be most immediately and permanently impacted, our primary concerns are 1) **NOISE** 2) **SAFETY** 3) **INCREASED TRAFFIC/PARKING CONGESTION** 4) **PROPERTY VALUES** - i.e. **QUALITY OF LIFE**. We are guessing that many people don't realize how intensely sound travels upward. When it's not windy and the cows are in the nearby pasture, we can hear them chewing! And one of us even has a hearing aid! You know how it feels on a bus or other public space when someone starts talking on their cell phone? That's what it's like living above the roadbed. Every conversation. Most of us moved here because we enjoy the quiet of rural life. If the proposed path is implemented it will change that possibility forever. It would be especially intrusive on weekends when most of us are wishing for the sanctuary of home and rest. We invite you to come and hear for yourselves.

If public access is granted, there will be no control over the amount and frequency and amplitude of noise. This is a startling prospect. I imagine the wildlife, if they were burdened with forethought, might feel the same way. The roadbed affords a wildlife corridor and, as you well know, any increased human presence will diminish wildlife activity and habitat. At one meeting, Don spoke of his own experience of living far above Whitehouse pool parking lot and yet being

disturbed by the weekend noise coming from people gathered there.

Realistically, who would **police** the pathway? And what about the very real **fire hazard** of smokers out for a stroll? **Vandalism** of the hunt shack? The inevitable roving **dogs** and their effect on wildlife? People coming to **drink**, to **argue**, in search of better **cell phone** reception? And where will they **relieve themselves**? Although the proposed pathway might be lovely for the occasional silent birder, more realistically – oy! what an **attractive nuisance**. Having a **public rather than private neighbor** is a vast quality of life change, and leaves us feeling very **vulnerable**. And, of course, affects **property values** as well. We are asking you to feel how you might feel if you lived here.

In addition, having a destination point here and yikes! – a possible parking lot , observation deck, and picnic table?! – would exacerbate not only the noise but also increase the foot, bike, and car traffic on Mesa Rd.. We feel sad and concerned about this prospect. We do not look forward to more booming voices of bikers, as they zoom by, yelling back and forth to each other about their jobs and their latest trips and their lives. Or vehicles parked all along the bottom of Mesa Rd. Or curious humans hopping fences.

There are 75.000 acres of Park for people to walk in and already several existing access points (*with* parking) to the proposed Wetlands. Most of us don't want to go to town any more on the weekends because it has become so crowded. Must we let this crowdedness now spill over into our residential neighborhood? New access points will create this. (Especially when they get published in the next *Secret Places of Pt. Reyes* !) The roadbed is not going to become a through pathway (although this might well be considered an invitation by those who would like it to), so it seems a heavy cost for very little advantage. Let's use the limited funds available for restoration, not *more* public access. ADA access could easily be met at the White House Pool c Olema Marsh parking lot.

Please hear us! We are seriously and ardently trying to hold onto our neighborhood and a quality of life that we cherish. Quiet

itself has become an endangered species and we humans are all suffering from the lack thereof.

As current residents, we are part of the existing environment so we are urgently requesting that you reconsider the proposed, unnecessary pathway and consider the habitat of those who already

live here as seriously and heart-fully as the habitat of the rails and goby and red-legged frogs is being considered.

Thank you for your time and attention.

Respectfully

(and with great appreciation for all the work you have done on behalf of the wetlands),

Marianne Sakellar	Susie Logan	Doris Allen	Hathaway Barry
Justin Tibbitts	Ben Logan	Nancy Sakellar	Kai Barry
Gabriel Tibbitts	Nick Logan	John Sakellar	Coeylen Barry
Kate Wilson			
Maria Wilson			

Kai Barry
<kaibarry@yahoo.com>
02/13/2007 10:31 AM
PST

To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: Giacomini Wetlands -- Alternative D

February 13, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956
RE: Comments on the Draft EIR: Giacomini Wetlands Restoration.

Dear Don Neubacher:

I would like to express that I am strongly in favor of Alternative D for the Giacomini Wetlands Restoration. I believe it's important to restore the wetlands as much as we can and to keep human access to a minimum. There are already plenty of access points.

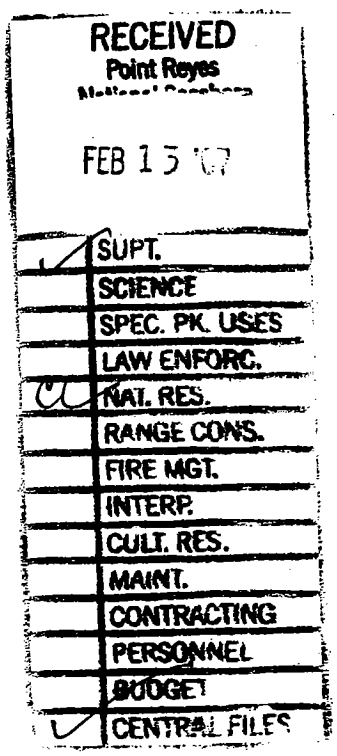
I grew up in Point Reyes and would not like to see the community so drastically changed. Adding access points throughout the town and in the Mesa neighborhood will welcome the park's tourists into our sleepy community. Additional access points will only increase traffic congestion and parking problems within the town.

It is important to remember the spirit of restoration and return these wetlands to the animals and ecosystems we took them from in the first place.

I am firmly in support of Alternative D.

Thank you for your time.

Kai Barry
Point Reyes Station.



Julia Bartlett
<jujub@horizoncable.com>
02/13/2007 01:11 PM
PST

To: <pore_planning@nps.gov>
cc:
Subject: Giacomini Restoration Plan Letters Due by Tuesday 2/14

Subject: EAC Announcement: Giacomini Restoration Plan Letters Due by Tuesday 2/14

Dear Don et al,

Thank you for asking us for our opinions on this important matter. I am in favor of plan D with the addition of the southern bridge.

Thank you.

Julia Bartlett

RECEIVED
Point Reyes
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

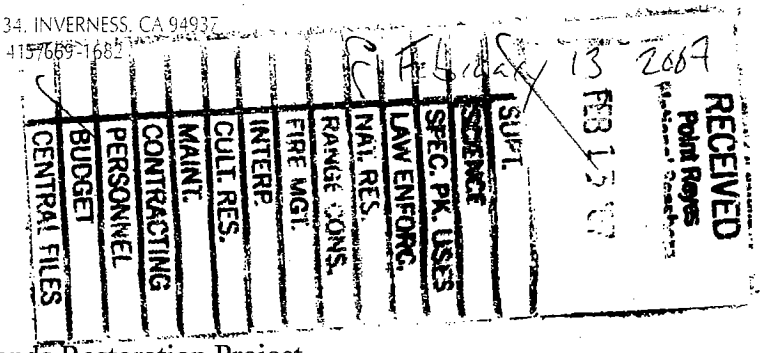
January 25, 2007

Please add any additional issues that were not brought up at this meeting:

I prefer Alternative D, with the inclusion of southern public access trail. The possible spur trails at Mesa Rd & the Martinelli Property would interfere w/ the free access of critters from wetlands to uplands - V. impt. Thank you.

Julia Bartlett

THOMAS G. BATY
P.O. BOX 534, INVERNESS, CA 94937
415/669-1682



Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes CA 94956

Subject: Comments on Giacomini Wetlands Restoration Project

Dear Don,

Here's my bit of lay-wisdom on the Giacomini Project. I would like to offer a voice of support for Alternative D with the addition of two significant changes.

The first is the widely-supported inclusion of the pedestrian footbridge over Lagunitas Creek. Since Alternative D calls for spur trails from both sides of the "Southern Perimeter," bridging the two seems like a golden opportunity for non-vehicular connectivity with minimal environmental downside. The price-tag of such a bridge seems to be the only real deterrent, but wouldn't this qualify the project for some transportation-type funding? May I suggest that the NPS consider naming the bridge the "Sis Arndt Memorial" in honor of her unwavering advocacy of this ecosystem for so many years.

The second suggested change would be to reach further into your partnership with the State Lands Commission on this project and secure the jurisdiction/management of the northern half of the headwaters marsh—what is now the Tomales Bay Ecological Reserve. While I strongly support the Park's fairly recent limitations on hunting in the Bay, this policy has caused a discernable concentration of hunting activity on the TBER. Does it make much sense to spend millions of dollars on a marsh restoration to create conditions that may well increase hunting pressure within the very marsh system we are attempting to preserve and protect? There is a very real possibility that the improved waterfowl habitat in the Giacomini Wetlands will increase hunting on the Bay. My previous recommendations for a comprehensive marsh management plan were met by observations from your staff that hunting/no hunting boundaries will always generate greater hunting pressure, but this discussion took place well before the development of your current policy.

Of course I realize the Giacomini Project is about far more than simply duck and goose habitat. But yesterday morning I found myself thinking about the Giacomini Wetlands as I hiked out along Limantour Estero and marveled at the thousands of ducks and geese feeding and loafing in that salt marsh system. Wouldn't it be fine to truly protect another "complete" marsh through this deal? Seems like a very choice opportunity.

Sincerely,

Thomas G. Baty

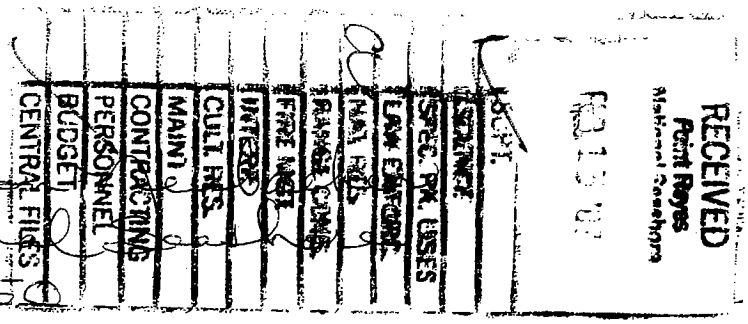
Dear Park Staff

I strongly endorse Plan C that includes pathways & a connecting bridge across the creek.

Thank you

William Barnett
Box 89
Inverness Ca 94937

February 12, 2007



Superintendent [illegible]
Point Reyes National Seashore
Olema, Ca 94950

Re: Giacomini Wetlands Restoration Plan-

Dear Superintendent Neubacher:

This letter is in support of comments presented by the Chairperson of the Design Review Committee of the Point Reyes Station Village Association.

Restoration measures described in 'Alternative D' should make the least negative impact. "Wetlands are the hardest part of the environment to repair once damaged" says Christopher Hallowell, author of 'Holding Back the Sea'.

Public Access should be limited to an observation area away from the residential areas.

The purpose is to restore the wetlands. Doing so in the simplest, most straightforward manner can only help the process.

Thank you,

Elizabeth L. Beatty
P.O. Box 534
Point Reyes Station, Ca 94956

"Elsie Becker"
<elsiebecker@gmail.com>

02/10/2007 10:36 AM
PST

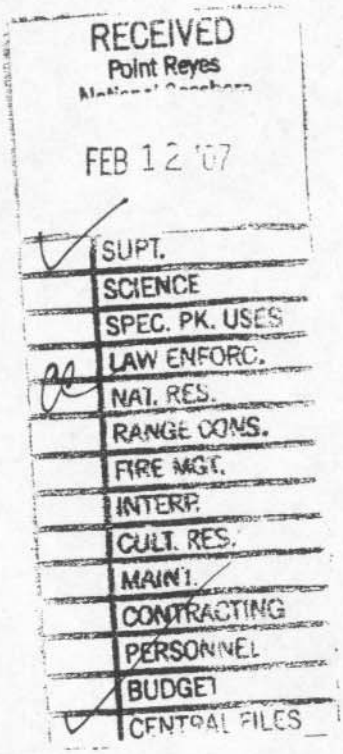
To: pore_planning@nps.gov
cc:
Subject: Giacomini Wetlands Restoration Project

Dear Superintendent Neubacher:

I am in favor of plan D for the restoration project since I feel that there is so much public access in the Pt. Reyes Peninsula area that it is time to give wildlife more access without human interference. Also, for the same reason, I don't see the necessity of a trail between the Green Bridge and White House Pool.

Sincerely,

Elsie Becker



February 11, 2007

Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

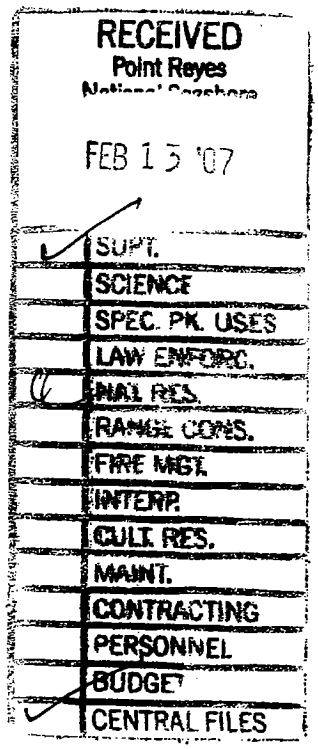
Subject: Giacomini Wetlands Restoration Plan

Please support Plan D, WITHOUT the 100 ft long Bridge. It is crucial to maintain and expand wetlands for bird migrations. Maintaining wetlands means a quiet place for migrating birds to rest. The addition of the Bridge to Plan D breaks the barrier between the goal of maintaining wetlands for migrating birds and weekend TOURIST activities.

Sincerely,

John Becker
PO BOX 1102
Inverness, CA 94937

cc:
Regional Director
National Park Service
1111 Jackson Street
Suite 700
Oakland, CA 94607



P.O. Box 1147
Pt. Reyes Station, CA 94956
February 7, 2007

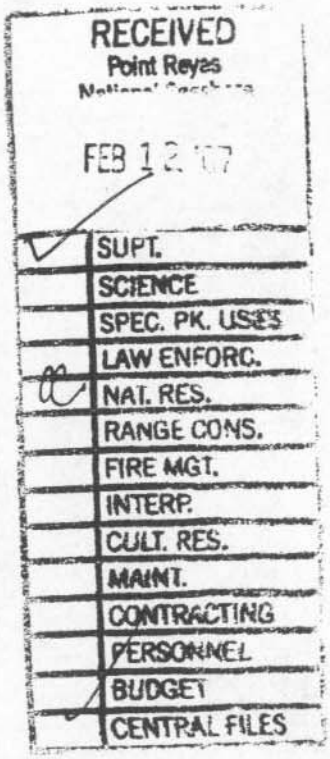
Superintendent
Pt. Reyes National Seashore
Pt. Reyes Station, CA 94956

Dear Superintendent Neubacher,

Regarding the Giacomini Wetlands Restoration Plan, I support Alternative D.

I feel strongly that as much of the former ranch as possible should be off limits to people and domesticated animals. Since most of the thousands of acres of adjacent National Seashore and GGNRA are accessible to the public, there is no reason to further limit the "kidneys" of the bay.. Every bit of wetlands will help restore Tomales Bay to its original pristine state .

This project can become a national model of responsible stewardship of our environment. I hope that no special interest group will be allowed to diminish it.



Sincerely,

R. Dean (Lee) Benzinger

Lee Benzinger

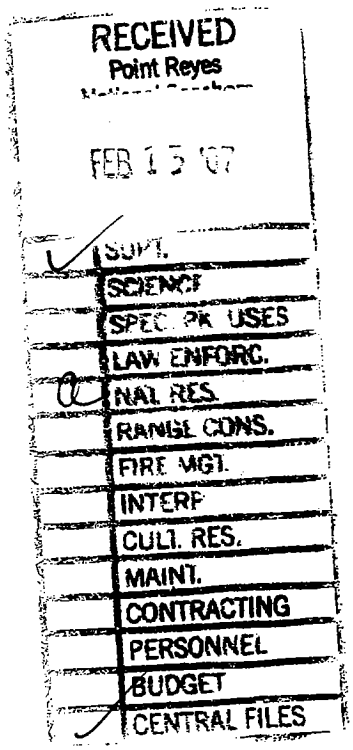
"Winston Black" <winstonblack@msn.com>
02/13/2007 11:10 PM GMT

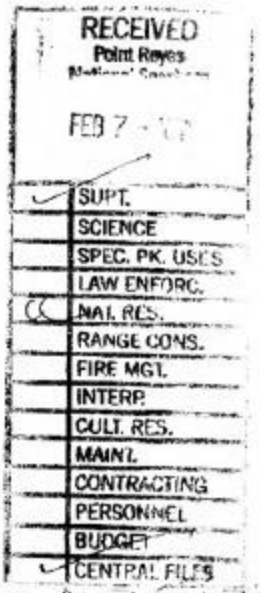
To: pore_planning@nps.gov
cc:
Subject: Bridge at Giacomini Old Dam Site

Dar Sir:

It is a good idea to consider the installation of a bridge at the site of the old Giacomina Dam.

Best, Winston Black, 58 Drake Summit, Inverness
Mailing: P O Box 15, Pt. Reyes Stn., CA 94956





~~FEB~~ 6, 2007

DON NEUBACHER
SUPERINTENDENT
PT REYES NATIONAL SEASHORE

DEAR DON —

PLEASE LET THIS NOTE SERVE AS MY NOTIFICATION TO YOU AND NPS THAT I ENDORSE ALTERNATIVE D. FOR RESTORING WETLANDS ON GIACOMINI RANCH.

THE IDEA of A BRIDGE OVER LAGUNITAS CREEK IS A BAD IDEA THAT INCREASES HUMAN ACTIVITY IN THE RESTORATION AREA. ALSO YOUR FISCAL RESPONSIBILITY COMES INTO PLAY WHEN ONE GOES TO THE TROUBLE ~~TO~~ TO TAKE THE COST FOR BOTH A BRIDGE AND THE ACTUAL NUMBERS of Bicycle [illegible] IN INVERNESS PARK. DO THE MATH AND YOU WILL FIND IT POOR USE of PUBLIC FUNDS TO SPEND SO MUCH PER EACH BIKE RIDER.

MORE IMPORTANTLY, FROM MY PERSPECTIVE AS A PROFESSIONAL WILDLIFE BIOLOGIST & FIELD NATURALIST, WHO HAS RESTORED WETLANDS MYSELF ON MY RANCH IN THE KLAMATH BASIN, THERE IS SO LITTLE COASTAL WETLANDS IN CALIFORNIA THAT THE PRUDENT COURSE of ACTION MANDATES DOING EVERY, AND EVERY POSSIBLE TO CREATE ~~AS~~ THE OPTIMUM CONDITION FOR THE WETLAND RESTORATION.

NO "BRIDGE TO NOWHERE!!"

SINCERELY,

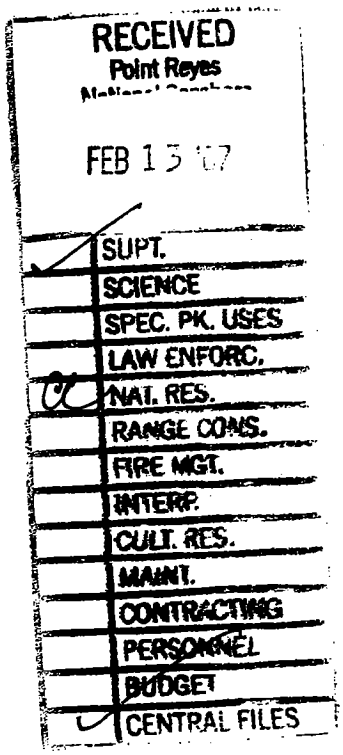
Gregg Bloche
P.O. Box 152
INVERNESS, CA 94937

BBochte@aol.com
02/12/2007 08:13 PM
EST

To: park_planning@nps.gov
cc: jon_Jarvis@nps.gov
Subject: Giacomini Wetlands Restoration Plan

Dear Park Service,
I am a long time resident of Marin County, bike rider and hiker. I am emailing in response to your considerations for the restoration of the Tomales Bay estuary. I am adamantly in favor of Alternative D to allow for the optimal healing and vitality of this unique ecosystem. I know there are already miles and miles of hiking and biking trails in Marin. An estuary is a biological nursery and needs to be treated like one. Please consider Alternative D for the Giacomini Wetlands Restoration Plan.

Bruce Bochte
311 Rydal Avenue
Mill Valley, CA 94941
415-381-3456
bbochte@aol.com



"Susan M. Brayton"
<susanbrayton@horizoncable.com>

To: <pore_planning@nps.gov>
cc:
Subject: Giacomini Wetlands Project

02/12/2007 08:54 PM
MST

I support Plan C ... however,

At the January 25th meeting you passed out cards asking for comments on additional issues that were not brought up at the meeting.

It is not clear from the maps I have looked at today if the County will still maintain the current County Parks adjacent to the Giacomini Ranch and at White House Pool. I would like (responsibly) to continue to walk my dog in this area, as presently permitted, as would other residents who have companion animals. And in view of the proposed bridge & path to Point Reyes Station, as well as pedestrians & cyclists, I hope it will be permissible for those of us with dogs who also live in this area to walk from White House Pool to town with our animals,

Thank you for your consideration.

Susan brayton

RECEIVED
Point Reyes
National Seashore
FEB 15 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Brostrom
1116 Curtis St
Albany CA 94706

OAKLAND CA 946
12 FEB 2007 PM 7 L

2/12/07

Superintendent Pt. Reyes
National Seashore
Point Reyes, CA

This is just a short note to voice my opinion that there should not be trails into a newly proposed wetland restoration on Tomales Bay. There are plenty of opportunities for hiking at Point Reyes, White House Pool and Martinelli Open Space. What is in short supply are habitats without human intrusion.

Margaret Brostrom
1116 Curtis St Albany CA

Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Dear Superintendent,

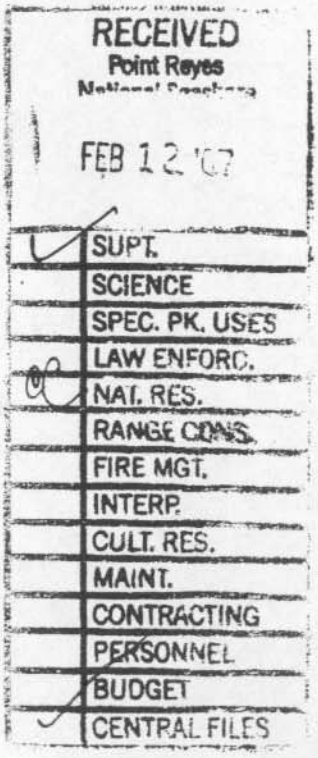
As a twenty-three year resident of West Marin, I am writing this letter in support of Plan D. The reason so many of us live here is due to the beauty of the nature and the privilege of living so close to wildlife. The site of the proposed parking lot on Mesa Road (Plan C) is crucial to wildlife. After all the habitat that has been destroyed for our "conveniences," paving over an area used by other species can no longer be considered an option. I ask you from my heart to please support Plan D.

Sincerely,

Sharon Buquen

Sharon Buquen
M.A. Education
State of California Credentialed Teacher

Buquen
P.O. Box 1046
Bolinas, CA 94924



Ann Nelson

01/25/2007 11:26 AM PST

To: Lorraine Parsons/PORE/NPS@NPS, Don Neubacher/PORE/NPS@NPS
cc:
Subject: Fw: From NPS.gov: Giacomini Wetlands Restoration Project

FYI

2babc4@earthlink.net

01/24/2007 10:36 PM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetlands Restoration Project

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

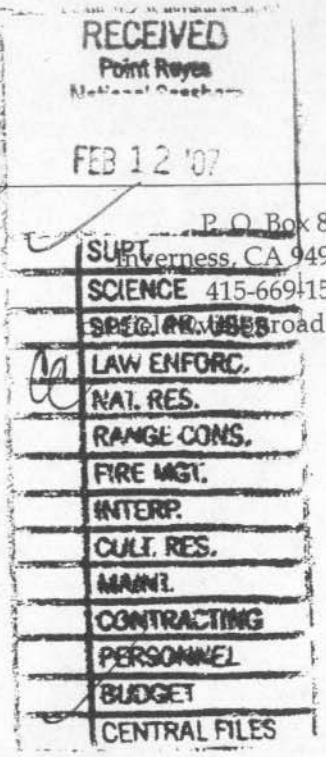
i support EAC's proposal of Plan D with a bridge over the creek. As a user of both ends of this trail, I would be delighted to make the walk without detouring to Levee Road.

Thank you for your consideration. I am sorry not to be free to attend the meeting on Thursday the 25th.

Barbara Carlitz

Catherine Caufield

P.O. Box 884
Inverness, CA 94937
415-669-1570
[illegible]road.us



February 12, 2007

Superintendent Don Neubacher
Point Reyes Natinal Seashore
Point Reyes, CA 94956
via email: park_planning@nps.gov

Re: Draft EIR, Giacomini Wetlands Restoration

Dear Superintendent Neubacher,

I want express my support for Alternative D, the environmentally preferred alternative, of the Draft EIR. Wetland and creek restoration and wildlife protection should be the overriding values of this restoration project. Public access, education, views, etc, should take second place to these priorities. I am especially concerned about the negative impacts of placing a bridge in the stream buffer zone of Lagunitas Creek, perhaps the most important salmon creek in Marin County, and one that has suffered much abuse and needs all the restoration it can get.

I support the arguments of others, more qualified than I to make them, regarding the ways in which Alternative D would be more successful than Alternative C in achieving the primary goal of ecosystem restoration and I wish to register my strong support for their conclusions and for Alternative D.

Thank you.

Sincerely,

Catherine Caufield

Catherine Caufield
cc: Jon Jarvis

I am voting strongly for Proposal D.

1. Proposal D is consistent with the values of our community. It asks that we do the uttermost for the restoration, preservation and protection of our natural environment.
2. Public access can always be considered in a second stage, later on, when we have seen how successful the restoration process turns out to be, whether it requires more money and time and therefore more focused energy than presently imagined.
3. I strongly disagree with the proposals from the Sierra Club and the Biking Club, that we undertake considerable public access as a modification of Plan D.Two reasons for this: aesthetic and aesthetic It is certainly a lovely idea to link our communities, but a structure like the bridge, prominently positioned at the entrance to a beautifully preserved wilderness area is bound to give us the look of artificiality—as if we were a golf course or worse yet, a kind of Wilderness Theme Park. It is very difficult to preserve, quite easy to destroy, the integrity of a place like Point Reyes.
4. Preservation/restoration is headed in a direction that restores the natural flow and shape of our land. The public access, as presently conceived, seems to move in the opposite direction—adding structures that are not and have never been part of our natural terrain.
5. There are so many miles of trails for bikes and horses and walkers in Point Reyes. Why is it necessary to take this area so close to town and introduce what is bound to occasion at least some added congestion, privacy issues, parking problems?
6. Let us concentrate our energy, our money, our planning capacity on the environment.
7. **Proposal D is what the Point Reyes Peninsula is! The other proposals do not do it justice.**

Kim Chernin, 704 B Street, Point Reyes Station, CA 94956 663 9511

gchisholm@audubon.org
02/12/2007 01:35 AM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetlands Restoration EIR/EIS

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

Dear Don Neubacher:

We appreciate the opportunity to provide comments on the Giacomini Wetlands Restoration Project. We are supportive of the Alternative C and pleased to see this important restoration project get underway.

As a neighbor I would like to bring several issues to you and your staff's attention along our common property boundary just north of the Giacomini Clubhouse.

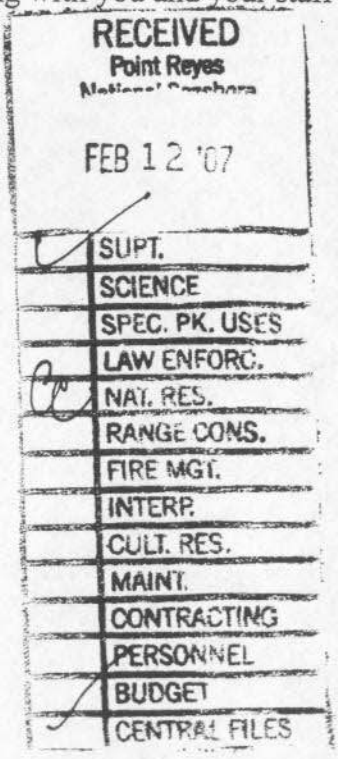
We have a number of eucalyptus trees along our boundary though I am not sure of the exact line between our property and NPS managed land. We would be supportive of the removal of the boundary eucalyptus and working together on the removal of eucalyptus on our hillside along with the restoration of native upland habitat on both our land and the old railroad grade next to the pasture. We would be interested in undertaking a collaborative project to restore native habitat.

In addition, prior to full transfer of the property I would like to ask that the sizeable pile of irrigation pipes that have been abandoned for a long time along our property line be removed and that an abandoned shack on our common property boundary be removed and that the electric line to the shack be shut down to reduce fire risk.

I appreciate your attention to these details and look forward to working with you and your staff to seeing this project succeed.

Sincerely,

Graham Chisholm and Kelly Cash



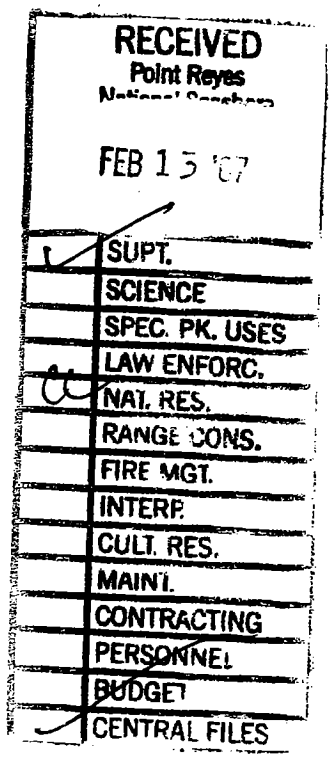
Kay Clements
<kay@kwmr.org>
02/12/2007 12:35 PM
PST

To: pore_planning@nps.gov
cc:
Subject: wetlands restoration

Hi,
I just wanted to comment briefly on the proposed trail connecting Inverness Park with Point Reyes Station. I believe access to Pt Reyes via an off road trail would be used by many residents and kids on bikes and a good idea. What I would like to see is the trail as a throughway, not
a freeway for weekend bicyclists.

I believe that visitors to the area bring a different sensibility - not to say they don't appreciate what is here, but I think it is a little removed from the community and not always as conscientious. When you are on a trail and see your neighbor, you make the extra
effort to call out or move aside. If a trail is going to connect IP and PRS, let it
be to facilitate and protect local traffic, not provide another raceway for
the bicyclists to group up and dominate.

thanks for your consideration.
Kay Clements



Ann Nelson
01/11/2007 03:24 PM PST

To: Brannon Ketcham/PORE/NPS@NPS, Lorraine Parsons/PORE/NPS@NPS
cc:
Subject: Fw: From NPS.gov: Giacomini Wetland Restoration Project: Draft Environmental Impact Statement / Environmental Impact Report

FYI

gerry@horizoncable.com
01/11/2007 06:01 PM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetland Restoration Project: Draft Environmental Impact Statement / Environmental Impact Report

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

Having such short notice to address my concerns about the subject Project please know that these matters are not all of them:

I object to the fact that the local newspaper of record, either in the County of Marin or in West Marin did not report your deadline being today for the deadline to comment on the subject study plan.

The study does not describe why the CALTRANS money has a link to being used to consider "Transportation" issues on and near the subject property.

The study/report contains no cost estimates for each of the four proposals. There is no cost/benefit analysis for each of the four proposals.

The report presents little to no summary information showing how using the property's edges for public enjoyment and transportation had no negative impact on restoring the property's wetland features.

The report has little to no information that deals with important matters concerned about:

(a) Bicyclist safety issues including accidents in the area; (b) Why bicyclist use in the area is discouraged due to poor conditions for safety and enjoyment (very narrow roads, heavy motorized traffic, etc.) (c) Motorized traffic patterns between towns and neighborhoods bordering the property to show that such traffic is increasing: (d) There is no safe way to travel by foot or bicycle north of Point Reyes Station to the Martinelli Park. (roadway there has little to no shoulder space) (e) Explaining why the nearby town's community plan shows no interest in reopening the nearby Abandoned Railroad Right-Of-Way (ARROW). This includes why it has little giving local residents easy access to the property's easterly side, to other neighborhoods, and to the area south of the subject property. (f) That the property's ARROW connects to the ARROW on the east side of the nearby town that also connects to the ARROW at Tocaloma that has been reopened. Omitting this significant off-road transportation system information misleads the reader who does not know the area on an intimate basis. (g) No mention is made about the fact that for the past 27 years the local community has shown an interest in having this ARROW reopened while at the same time well connected residents living on the hill adjacent to the

ARROW have done what they can to defeat its reopening; (h) No analysis shows how the ARROW uses none of the dry land near what had been wetland before the ARROW was constructed over a hundred years ago: (i) Why the restoration project must include transportation issues in the area of the subject property. If its edges are not considered for public use (bike and walking paths) then an important opportunity is abandoned. (j) The Olema Marsh public access path issue should be considered in all four options and so it is included in the option settled on. (k) Dating back 27 years (1980) it has made been known at public meetings and in public reports that it wants the subject property's ARROW reopened so it connects to the ARROW on Point Reyes Station's east ide all the way to the ARROW at Tocaloma that is in use for the public's safety and enjoyment benefit.

Lastly, it must be noted that none of the public hearings about a matter of this importance that concerns the public at large (those residing outside of West Marin) was never held outside of West Marin - even though it is known this public uses their federal parks here in West Marin on a basis that represent 82% of the users from the Bay Area and beyond.

For all these and more reasons it must be known that the subject study was biased in favor of only restoring the property to a wetland while it ignored how public access can coexist along with wetland restoration.

Gerry Coles PO Box 353, Bolinas, CA 94924 (tele: 868-1108)

Gerry Cirincione-Coles
<gerry@mermaidhill.com>

02/14/2007 08:27 PM
PST

To: park_planning@nps.gov
cc: lorraine_parsons@nps.gov
Subject: Giacomini Wetland Restoration Project

Please be advised that your subject's EIR is incomplete until it deals with the following matters:

(a) As the dire effect Global Warming will surely have on the restoration project, and the data presented in the EIR now does not deal with how the additional height of two more feet over previous expectations - means the EIR is insufficient in this regard.

(b) That it was most arbitrary (slanted to favor Alternative C) how the study dealt with various schemes to allow public access, but did not show, for example that the abandoned railroad right-of-way (ARROW) could be restored to public use (as proposed in Alternative A) along with having the maximum method of restoring the property to a wetland (as proposed in Alternative C or D) - even a casual reader of the EIR will easily note its bias that favors Alternatives C and D, but don't consider opening the ARROW to public use.

(c) That no public meetings to encourage public comment were held outside of West Marin shows an intent to influence the results of the EIR to favor Alternative C (aka: the "Preferred Alternative) even though a NPS study proved that more than 80% of the public who frequent the federal parks in West Marin actually reside outside of Marin County. The NPS made no effort to solicit public comments from the public who use their parks in West Marin because it hosted no public meetings outside of West Marin means that the subject EIR has not had a fair hearing as far as the greater public is concerned. Considering that the public who attended the public meetings on this subject are locals who are well known to not be receptive to having 3 million visitors in their area - thus the results of the meetings reflect the EIR report's bias, which results in their not being receptive to making the subject property being made more attractive to visitors. In this regard the EIR should cite the fact that the West Marin Chamber of Commerce (WMCC) is not a member of the Marin County Visitors and Convention Bureau because the latter wants to service the needs of visitors to Marin County and while the WMCC, like the local residents has not shown this interest on a local basis.

(d) Considering that the town of Point Reyes Station borders the subject property, but has nothing in its General Plan that proposes any convenient access for its residents on the subject property or to the federal park to its north that has no access but from Highway One - proves a local bias against giving this matter a thorough hearing at the local level, which is the only feedback the NPS seems to have relied on in its EIR with regards to ordinary civilian input that isn't scientific.

(e) While several consultants whose Literature is cited in the EIR (J.G. Evens, PWA, etc), and it is well known that their bias did not support opening the ARROW, means that the EIR's Literature information does not cite that of any known supporter for opening the ARROW.

(f) With regards to the List of Preparers, it can be substantiated that one person who contributed to the EIR at this level (Jules Evens) has

made it clear in a public record (Point Reyes Light) that he is against opening the ARROW to public use. That this EIR used no consultants who understand the benefits of wetlands coexisting with ARROWs, Alternative Transportation, etc. shows its bias that favors a maximum wetland restoration with an a minimum of public access.

(g) With regards to Public Safety: the fact that the EIR concerned with a property that borders a town that has the most residents of any town in West Marin needs additional information about an issue of vital importance considering that all roads bordering the subject property, and the town nearest it, are narrow two lane roads that must accommodate about 3 million visitors (1 million cars?). This EIR must have project how public safety would be improved if the 550 acre property's ARROW is reopened, and it had off-road paths along its southern and western edges for the benefit of bicyclists and hikers so they could travel away from high speed motorized traffic.

(h) With regards to CALTRANS contributing the greatest share of purchase monies to acquire the property the EIR explains almost nothing about the "....legal agreement between CalTrans and the park, which only obliges the park to mitigate 3.6 acres, all agencies agreed that more fully restoring lands on the acquired property was the ultimate goal, and the MOU called for restoration of a 'significant portion' of the historic marsh." Why isn't the MOU in the EIR? Does "significant portion" mean 80% (440 acres) or 90% (495 acres)? In either case it easily leaves enough land to be set aside for public access: 440 acres in wetland leaves 110 acres for public access, or 495 acres restored to wetland still leaves 105 acres for public access. Considering that the EIR contains no analysis that shows any computations for how much land would be used for public access in any of its alternatives means the EIR is totally inadequate with regards to its meaning of: "significant portion".

(i) Considering that the ARROW had been in historical "transportation" use for many decades, that the public roads near the subject property are not safe for bicyclists and pedestrians, it doesn't take a rocket scientist to conclude that the property can be restored to wetland, but at the same time must also accommodate the public's transportation (aka: safety) needs. And this is what the ARROW would accomplish as would construction of other off-road paths near its southern and western edges.

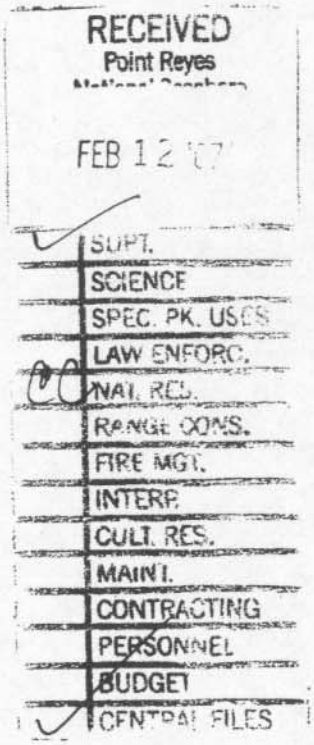
Gerry Coles
PO Box 353, Bolinas, CA 94924
(tele: 415-868-1108)

Rigdon Currie
<rigdon@horizoncable.com>
02/09/2007 03:26 PM
PST

To: pore_planning@nps.gov
cc: Johnson Trish <patrish@horizoncable.com>
Subject: Giacomini Property

I like Plan C with the additional access and the bridge.

Rigdon Currie
1 Balboa Ave., P.O. Box 1120
Point Reyes Station, CA 94956-1120
415-663-1755
415-663-1756 (fax)
415-999-5855 (mobile)



Kathryn de Laszlo
<delaszlo@svn.net>
02/12/2007 09:59 PM
PST

To: pore_planning@nps.gov
cc:
Subject: bridge over creek for Inverness Park/Point Reyes Station

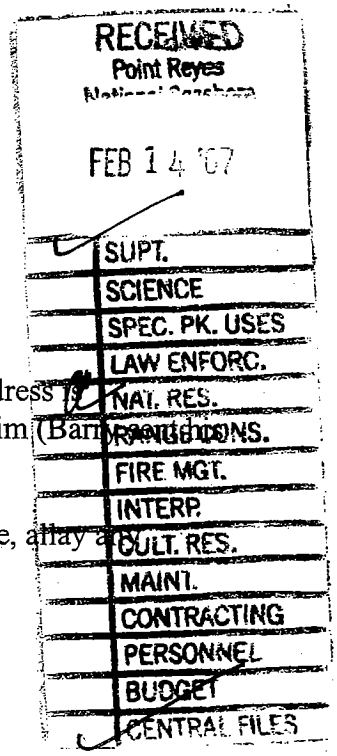
Dear Mr. Neubacher,

The reply to a bridge or no bridge is, from our household, a resounding yes! There is no better way to preserve the majority of our natural habitat than to create viable alternatives to vehicle transportation. Families and all those inclined to seek out alternative modes of traveling locally will benefit and be given the great gift of a close up reminder of the fragility and rarity of our landscape. there is nothing like getting out of the car and passing slowly through our immediate environment to remind us of what needs preserving for the future. Kathryn de Laszlo, Stephen Marshall and daughters. (415) 663-1964 email:delaszlo@svn.net

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Barbara Deutsch
<undone@lmi.net>
02/14/2007 12:56 AM
PST

To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: explaining a seeming duplication



Dear Superintendent Neubacher and Regional Director Jarvis:

I sent this earlier today (now yesterday) from my husband's computer (his e-address is Barry@ddw.com) forgetting to identify it as my comment, not a second from him (Barry's own comment from that e-address earlier this week). OK - Rec'd 2/12/07

I re-send mine now from this computer, to correct mis-impression -- and, I hope, allay any confusion.

Yours irregularly, but less so than before,
Barbara Deutsch (resident of levee road, Pt. Reyes Station)

comment in favor of alternative D, un-a-briDgeD

I am among those many who Do not want to see commercial exploitation or any carelessness in the implementation of a wetlanDs restoration project maDe financially possible by professional generosity and environmental conscientiousness.

who aDvocate the alternative most Desirable in terms of habitat restoration,

who wish human presence NOT to Degrade wilDlife habitat OR opportunities for other humans to enjoy and learn from unDisturBeD wilDlife presence

and who Desire that whatever is Done, be Done so as to restore where absent and safeguarD where present:

integrity of eDge, especially the water's eDge, but also the eDges of pathways

full, continuous, complex riparian habitat in the estuarine eco-tone, with optimizeD structural Depth and Density, in orDer to proviDe the concentration of resources that will naturally be sought there

effective buffering for wilDlife Dispersal corriDors

alreaDy estabLisheD wilDlife, and natural recovery alreaDy unDerway

maximum potential retrieval of natural sounDscape

least possible Disruption to visual fielD (e.g., Disallowing human intrusion in an unnaturally elevateD or accelerateD manner, or with what appear to be preDators, causing fright and other stress to wilDlife)

provision for choice for both wilD and human beings, incluDing the choice to be in a place free from DomesticateD or mechanizeD artifacts

and for the assurance wilDlife (and humans with sensitive awareness, itself in great neeD of restoration) Derive from limiteD and muteD human access

expanDeD amplituDe for re-ascenDance of natural patterns and rhythms

the full complement of Diversity, re-enDoweD with capacious amplituDe for evolveD inter-relationship

future opportunities for expanDeD and integrateD habitat recovery

the capacity of animals (the overwhelming majority of whom are invertebrates, "on thousands of whose backs every step is taken"), Distinguished from us and our Domestic subjects above all by their evolveD perfection, to live as fully as possible in what is after all their worlD, not ours; -- and, by that means, safeguarDing for ourselves the possibility of authentically knowing them -- a knowleDge that brought us into being, and that may yet rescue us from our present uncertainties about ourselves

and our own recovery of the awareness of who we truly are:

one recent and not yet reliable occupant of "a world of beings, in infinite and mysterious acts of connection, created from the earth, itself a being."

[quoted from Paul Shepard's "Digging for Our Roots," **Encounters with Nature**, p. 114]

Barry Deutsch
<barry@ddw.com>
02/11/2007 06:04 PM
PST

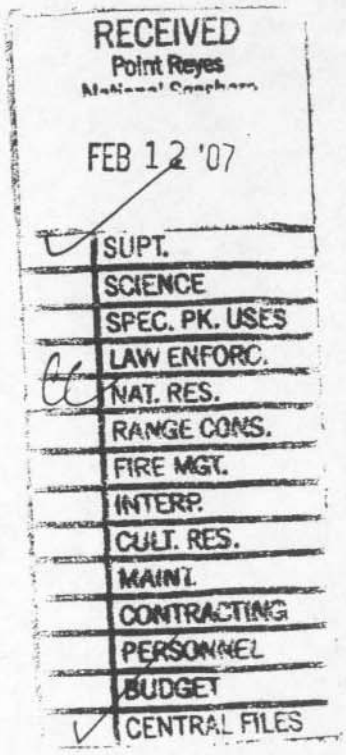
To: park_planning@nps.gov
cc:
Subject: Giacomini Wetland - Plan D

Dear Superintendent Don Neubacher:

Please follow the goals and purpose of the Restoration. This considerable and unusual opportunity can be THE example for future projects on how to bring back native wildlife and increase the habitat for creatures - other than our species! As a property owner and resident of Pt. Reyes Station, I'm particularly conscious of the sensitive nature of the wetland's edge. The impact of human disturbance on the river, birds, turtles, mammals, and all the other creatures is painfully obvious. The joy of seeing a Green Backed Heron or a Great Blue waiting... and wading in Lagunitas Creek is memorable - alas, so is their flight, caused by unleashed dog/s being "walked" along the bank while their owners chat obliviously.

Being conscious of the needs and political pressures of the situation, I strongly endorse PLAN D as is: WITH NO BRIDGE. I suggest you use the $800,000+ estimated cost of that bridge toward making the South Side of the Levee Road safe for bicycle and horseback riders, or find some other way to relieve the pressures on wild creatures, to whom we owe at least that.

Sincerely,
Barry Deutsch
11270 Sir Francis Drake Boulevard
Pt. Reyes Station



Don Neubacher
02/12/2007 03:55 PM
PST

To: Ann Nelson/PORE/NPS@NPS
cc:
Subject: Giacomini Wetlands Restoration Plan

RECEIVED
Point Reyes
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Don Neubacher
Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956

415-464-5101 (office)
415-233-0303 (cell)
415-663-8132 (fax)

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

----- Forwarded by Don Neubacher/PORE/NPS on 02/12/2007 03:55 PM -----

cornelia@horizoncable.com
02/12/2007 06:13 PM
EST

To: don_neubacher@nps.gov
cc:
Subject: Giacomini Wetlands Restoration Plan

Dear Mr Neubacher

I am writing to tell you that I very strongly support Plan D with no mutli use path along Lagunitas Creek.

I gathered at the meeting that you have been under a lot of pressure from the Marin Bike Coalition and others to put in the multi use path along Levee road.

I am probably one of the few local people who bikes regularly along Levee Road. I do it about 5 times a week and usually during peak hours. I think it is one of the safest stretches to bike around here because the road is wide and straight.

If people want to make it safer then all the county needs to do is mark off part of the hardtop for a bike path as they are doing in Fairfax. This would slow the traffic down a bit too.

The proposed multi use path will be so wide it will cut through prime riparian habitat and create noise and pollution along the waters edge.

It also attract weekend road bikers who will come down there in groups and at speed making everyone jump out of their way. I regularly walk the Samuel P Taylor multi use trail and it's positively hazardous, especially for children or seniors. They come at you at 20 miles an hour or more.

Please change your recommendation to Plan D.

Thank you very much,

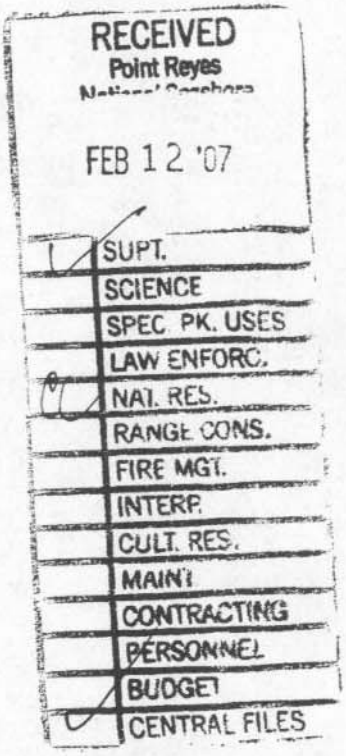
Best wishes

Cornelia Durrant
9 Los Reyes Drive
Point Reyes Station

"MikeBin"
<mikebin@svn.net>
02/11/2007 10:31 PM
PST

To: <Park_Planning@nps.gov>
cc: <mmery@horizoncable.com>
Subject: Marsh Option D

Agree with Michael Mery's analysis and comment. C would be ok, but D is preferred as it emphasizes restoration over access....of which there is enough. Mike Durrie, Inverness



Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Prefer Alt. D with addition of bridge on Southern Trail. Please eliminate spur trail at Mesa Rd going north.

Chuck Eckert

ALICE HART ECKART
Box 1090, 11 Mesa Road, Point Reyes, CA 94956 415 663-9016 eckart@horizoncable.com

Point Reyes
FEB 9 - '07
SUPT.
SCIENCE
SPEC PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 7, 2007

Mr. Don Neubacher, Superintendent
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

Re: Tomales Bay Wetlands Restoration Plan

Dear Mr. Neubacher:

Congratulations on the excellence and timing of the Draft Environmental Report on the Tomales Bay Wetland Restoration Project. I attended the public meeting and found the presentation informative and thorough.

After reviewing the details I am convinced that the choice should be Alternative D. It best meets the primary purpose of restoring natural hydrologic processes and wildlife habitat in the entire Tomales Bay watershed. Public access is a secondary issue.

I am particularly opposed to any development leading to an Eastern Perimeter trail that could eventually connect Mesa Road and the Martinelli Open Space to the north. Opening this area to hikers, bikers, dogs and horses would contradict the intent of renovation of natural habitat and restoration of the wetlands. It also would negatively effect the downtown Point Reyes Station, Overlook and Mesa Road residents with increased traffic and parking problems, and present privacy, security and noise concerns. I also wish to point out that our Community Plan specifically calls for protection of the Mesa bluff and a trail at its base would be a negative impact.

Neither do I encourage the Southern Perimeter trail and bridge because it would benefit so few people for such a short distance for a very large expenditure, and seems to counter the primary objective of restoration of the wetlands.

Sincerely,

Alice Hart Eckart

cc: Jon Jarvis, Regional Director
National Park Service
1111 Jackson Street, Suite 700
Oakland, CA 94607

Barbara Eastman
<eastman@horizoncable.com>

02/07/2007 06:01 PM
PST

To: park_planning@nps.gov
cc: jon_Jarvis@nps.gov
Subject: Giacomini Wetlands

This letter is to urge the Park Service to chose the Alternate D regarding the Giacomini Wetlands restoration. My opinion is that this alternate would protect the increase of human presence that will adversely impact the wetlands and the wildlife. The project was to restore hydrologic and ecologic function of the bay not to increase visitation to our small community. There are already 75,00 accessible acres just a few minutes and miles away. Tomales Bay is depleted of 50% of its wetlands. The bay has pressing water quality problems. WE NEED MAXIMUM RESTORATION. I urge you to select Alternate D.
Thank you,
Don and Barbara Eastman

RECEIVED
Point Reyes
National Seashore
FEB 7 - '07
SUPT.
SCIENCE
SPEC. PM. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

BEAR VALLEY INN
BED & BREAKFAST

2/12/07

ATTN: Superintendent
RE: Giacomini Wetland Restoration Project DEIS/EIR

After careful consideration of the materials provided to the public for the Giacomini Wetland Restoration Project and attending the public meeting on January 25, 2007, I feel that there is a significant gap regarding public access and transportation around the Giacomini Wetland Restoration Project.

In 2005, new Transportation Legislation for the National Park Service was passed into law as part of the SAFET-LU bill. These legislation funding changes do not appear to have been accounted for in the current DEIR. http://www.nps.gov/transportation/alt/ is link where I read the information

Has the park considered these new funding opportunities including Alternative Transportation in Parks and Public Lands and a Recreational Trails Program. As of 2006, the details were still being worked out on this program. Now is the time for the Park Service to get involved and secure funding for better public access for residents and visitors.

The southern perimeter trail shown in Options A, B & C is crucial to the local residents in terms of moving between towns, and will likely reduce vehicle trips around the Giacomini wetlands. Regardless of the chosen option, it should include not only the bridge at White House Pool, but also the establishment of a Memorandum of Understanding with Marin County Public Works to extend the path from White House Pool to Inverness Park.

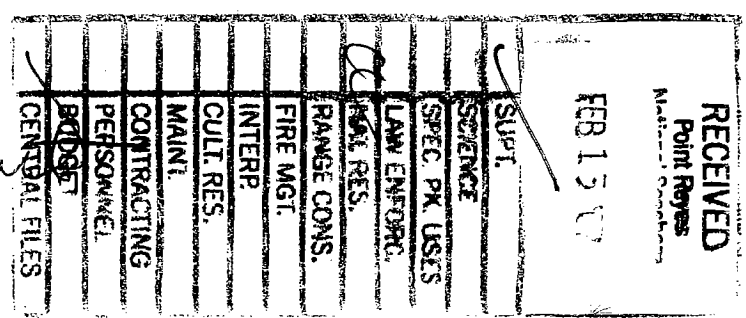
I prefer Options A & B because they include more comprehensive public access for the community. A connection to Railroad Point would enhance foot travel throughout this area. To not maintain hiking access to the railroad right of way is a loss to the community.

Future acquisitions including the railroad right of way as a continuation of the Cross Marin Trail into Point Reyes Station would go a long way towards moving people with an alternative to automobiles in the area.

Automobile emissions are one of the most destructive sources of single point pollution that exist. Reducing auto trips is crucial to the health of the wetlands as well as the plant, animal and human life in the area.

The park would do well to consider the larger picture in making your final determination regarding the option that is really best for the environment.

Sincerely,
Amanda Eichstaedt
Bear Valley Inn
Olema, CA



PO BOX 58 · 88 BEAR VALLEY ROAD · OLEMA, CA 94950
WWW.BEARVINN.COM · INFO.BEARVINN.COM · 415.663-1777

"Bart Eisenberg"
<barteisenberg@comcast.net>

02/12/2007 11:30 AM
PST

To: <Park_Planning@nps.gov>
cc:
Subject: Giacomini Marsh comment

Bart Eisenberg
Box 250
20 Sinaloa Ave.
Forest Knolls, CA 94933

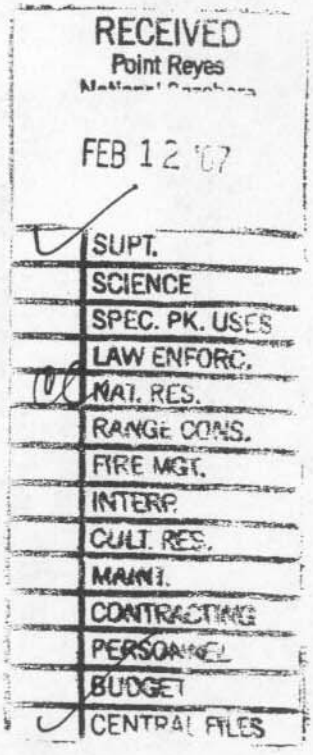
February 11, 2007

Dear Superintendent Neubacher

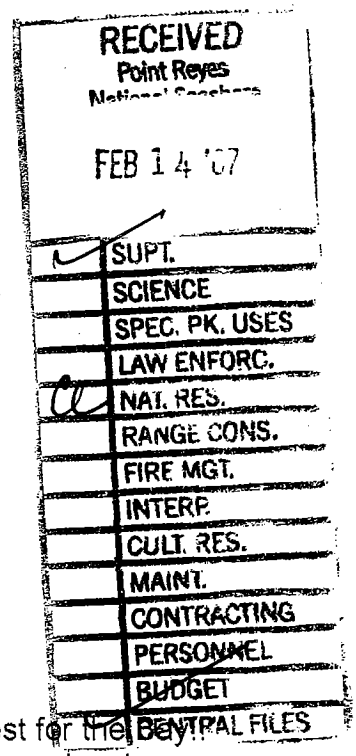
I want to express my support for alternative D in the restoration of the wetlands. Given the scarcity of wetlands in general and the abundance of recreational opportunities in West Marin, I believe that the balance should be tipped toward reviving this nearly lost ecosystem. Of course, the restoration itself also represents an educational opportunity—but that, rather than recreation, per se, is where hope the emphasis will go. In an era when so much wildlife habitat is lost, what a treat it will be to watch a bit of it be regained.

Thanks to you and your staff for this great stewardship. The word is overused, but in this case, it's completely apt.

Sincerely,
Bart Eisenberg



Gayanne G. Enquist
P.O. Box 577 – 15 Via de la Vista
Inverness, CA 94937



February 11, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Giacomini Wetlands Restoration Plan

Dear Don,

I urge the Park to implement Alternative D, which for me is "what's best for the Bay!" The ecological restoration is primary and all the other interests are secondary because of the rarity of wetlands (in general) and the overall health of the Bay and our entire ecosystem.

My grown daughters, who grew up in Inverness, remember and often brag to faraway family and friends that "Tomales Bay is one of few remaining pristine bodies of water—aren't we lucky?" How long ago was that a reality? I need to remind them that this isn't the case now.

Eliminate the access point parking area at the former worker housing site on Mesa Road. Access already exists at White House Pool, Martinelli Open Space and Olema Marsh. These trails, parking, etc. could be made ADA compliant. The Ag zoned property on the East side of the marsh should be in public ownership with removal of all barns, etc.

I am a long-time birder and believe that any increased human presence will impact the birds, wetlands and all other wild life. Please help to protect this environment with the most complete restoration possible.

Thanks to you and your staff for a strong evaluation and analyses, and for the opportunity to comment.

Sincerely,

Gayanne

Gayanne G. Enquist
Cc: NPS-J.Jarvis

RECEIVED
Point Reyes
FEB 6

Jules Evens

P.O. Box 839, Point Reyes Station
California 94956 USA
telephone 415/663-1148
fax 415/663-9235
e-mail jevens@svn.net

SUPT.
SCIENCE
SPEC PK USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP
CULT. RES.
MAINT
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 6, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Comments on the Draft EIR: Giacomini Wetlands Restoration.

Dear Don:

Although I worked on the compliance phase of the Giacomini Restoration Project as a wildlife biologist, I am submitting these comments as a private citizen, a long-time resident of Point Reyes Station, and a naturalist intimately familiar with the wetlands of Tomales Bay.

First, I appreciate the excellent evaluation provided by the Draft EIR and the thorough work that your staff has provided. You have cultivated perhaps of the best natural resources staff in the country and their excellence is reflected in the depth of the Draft EIR. I look forward to watching the restoration proceed and the health of the bay improve.

I would like to take this opportunity to urge that the Park implement Alternative D, "the environmentally preferred alternative." Because the entire impetus of this project was ecological restoration, I feel strongly that all other considerations (public access, education, viewscapes, etc.) should be secondary to that restoration process. The Park has a responsibility to protect and enhance habitats that sustain and support special status species. This can be accomplished only by advancing the most extensive restoration effort available given the constraints of the watershed and the site.

Toward that end, I hope the Park will incorporate the following goals into the Final EIR:

1) Implement Alternative D, without a bridge across Lagunitas Creek (as has been suggested by some advocates of public access);

2) Focus restoration efforts on the downstream portions of Lagunitas, Bear Valley, Olema, and Tomasini creeks. This requires limiting public access so that riparian and transitional marsh vegetation can develop fully at the fresh/brackish saline interface: this area is the most critical transition zone for numerous listed species, including salmonids.

3) Maximize tidal action and tidal access to the estuarine reaches of all drainages that feed into the south-end of Tomales Bay. This last goal argues for the various elements of Alternative D summarized in pages 77-80 of the Draft EIR. Of particular ecological importance is the adaptive restoration of Olema Marsh (pg. 79).

Alternative C, the Park's "preferred alternative," addresses some of these goals, but only as half-measures. Alternative D provides a more environmentally comprehensive approach, and, once implemented, will result in a more hydrologically dynamic and ecologically functional restoration.

Finally, I would like to suggest that the Park consider renaming the project and the site. Although the Giacomini family has made important contributions to the social and economic fabric of West Marin, the "reclamation" of the tidal wetlands at the south end of Tomales Bay, beginning in 1947, to create the Giacomini Ranch did more to degrade the ecology of the bay than any other modification, before or since. A more appropriate name would be "Tomlaes Bay Wetland Restoration."

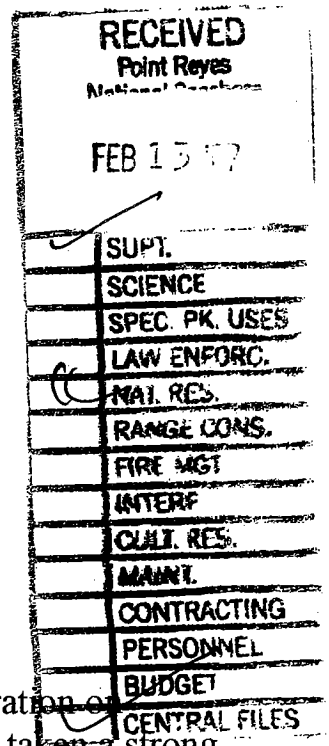
Again, thank you for your dedication to the natural environment of Point Reyes and Tomales Bay and for leading the Park Service forward in the spirit of restoration. I look forward to the day when clapper rails again nest and in these wetlands, when night-herons roost undisturbed in willows overhanging salmon swollen waters. Maybe someday we'll

Also, thank you for this opportunity to comment on the Draft EIR.

Naturally,

Jules Evens

Jules Evens
P.O. Box 839
Point Reyes Station, CA 94956.



February 11, 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956
Attention: Giacomini Wetlands Restoration Project

Dear Don Neubacher,

Thank you for your support of extensive wetlands restoration on Giacomini Ranch at Tomales Bay. I am glad that the Park has taken a strong stand for the restoration of these critical wetlands.

However, I support even greater restoration of the wetlands than the Park's current plan of Alternative C. I believe that Alternative C is insufficient because it allows too many new access-related impacts. We must do all that we can to maximize restoration of the wetlands.

I support Alternative D, because it will minimize adverse impact on the wetlands and goes the farthest in restoring the natural character of the region. I also support the construction of a bridge over Lagunitas Creek and the trail connection between Green Bridge and White House Pool, because of the contribution they will make to minimizing impact on the wetlands.

Thank you for your consideration,

Tom Faulk

Tom G. Faulk
901 Lark Court
Novato, CA 94947

Jeff Felix
<bonnandjef@horizonc
able.com>
02/11/2007 04:32 PM
PST

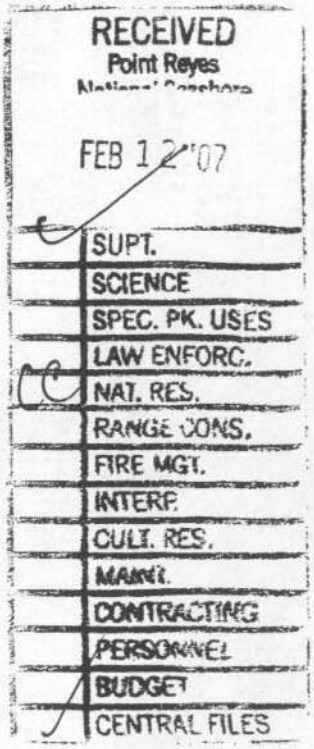
To: Park_Planning@nps.gov
cc:
Subject: Giacomini wetlands restoration

Dear Park Planning Team,

I am in complete support of the position put forth in Michael Mery's recent letter to you. Most importantly, I urge the Park to adopt Alternative D, which makes environmental needs and concerns the priority.

Thank you very much for seriously considering my point of view, along with that of others who are concerned enough to make their views known.

Bonnie Felix
POB 935
Point Reyes Station
Ca. 94956
414-663-1867

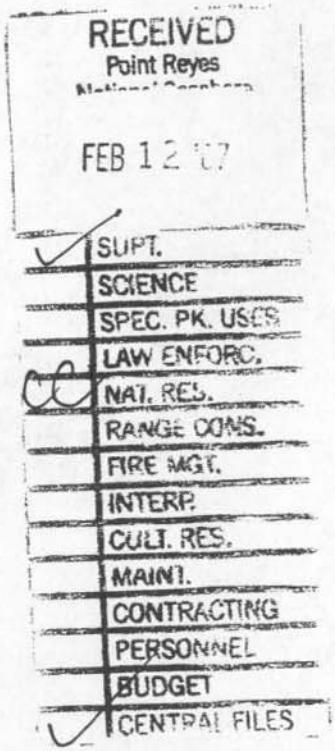


Jeff Felix
<bonnandjef@horizonc
able.com>

02/09/2007 06:32 PM
PST

To: pore_planning@nps.gov
cc:
Subject: Plan D

We, two residents of Pt. Reyes Station, vote for Plan D. Plan C with a parking lot off of Mesa Road
is unacceptable as it will invite intrusion into the natural habitat defeating the whole purpose of the
project. We hope that you will not give in to the special interest groups which have a stake in getting
Plan C through but prevail for the wild life, who are not organized pain in the asses, and implement
Plan D.
Thanks,
Jeff & Bonnie Felix
171 Mesa Road
Pt. Reyes Station, Ca 94956
415 663-1867



Point Reyes
National Seashore
FEB 14 07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

P A C I F I C L A N D I N S T I T U T E
Randall Gray Fleming, Architect

P.O. Box 252
36 Cypress Road
Point Reyes Station, CA 94956
(415) 663-8266

February 14, 2007

Point Reyes National Seashore
National Park Service
RE: Giacomini Wetlands Restoration

I am very pleased that the Park Service is proceeding to restore the wetlands. I do have several concerns and recommendations with regard to the alternatives presented in the EIR.

Public Access: I support Plan C; yet with the deletion of the parking and trail at Mesa Road.

- Encouraging pedestrian access from Point Reyes Station to the wetlands is very important. To increase pedestrian accessibility, extending the trail system from the observation area overlooking the wetland north along the edge of the wetlands and joining with 3rd street should be considered.
- With a town edged loop trail system, the parking and limited trail system that is north of the green barn off of Mesa Road should be deleted. Eliminating this parking and trail could reduce extra automobile trips that will occur from the town to the Mesa Road parking area and help create fresh water marsh with less disturbance.
- The wetlands and trail systems will likely increase visitor use and parking in the town. This increase will in turn add to already limited parking. To maintain a pedestrian, bike, and equestrian accessible town, the NPS needs to study traffic and parking impacts in the town and recommend mitigations, such as parking, shuttle access from existing park visitor sites, etc.

Urban Storm Water Runoff: This is not directly addressed in any alternative.

- The towns (Point Reyes Station and Inverness Park) will likely generate storm water runoff that includes sediments, nutrients, oil, heavy metals, pesticides and pathogens. A combination of grease/oil traps, primary settlement ponds, and the wetlands themselves should reduce these pollutants before entering the Bay. The NPS should monitor current pollutant loads, and with the County involvement, address urban runoff.

Pollutant Removal by the Wetlands

- It was mentioned in the public meeting that presented the alternatives; that the restored wetlands will have the capacity to remove 2 to 18% of pollutants entering into the wetlands from the surrounding watershed. While this may be reasonable, I am surprised that the wetlands would not remove higher percentages of pollutants. From my urban storm water experience, I understand that bio retention systems can remove 68 to 90% of pollutants. Perhaps the NPS could increase the performance standards of the alternatives, and adjust wetland configurations as necessary to maximize pollutant uptake efficiency.

Randall Fleming

forester@sonic.net
02/13/2007 03:04 PM
PST

To: pore_planning@nps.gov
cc:
Subject: Giacomini Restoration Plan

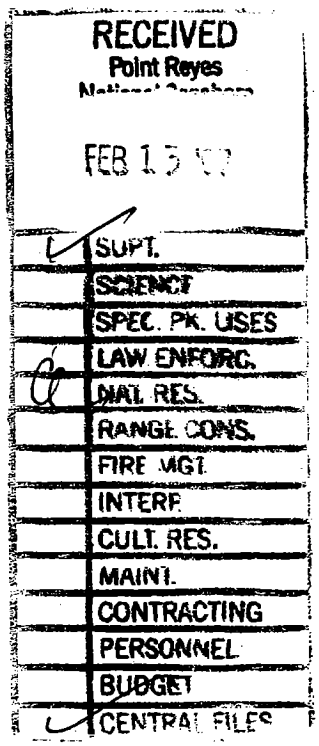
Dear Mr. Neubacher,

Unfortunately my husband and I were unable to attend the Jan. 25 public meeting, and we would like to voice our concern now.

Alternative D certainly provides the most extensive restoration potential for the benefit of wildlife, whereas Alterative C allows too much public access at the expense of wildlife.

EAC has the great idea of modifiying Alterative D to include a bridge over Lagunitas Creek, which would provide low-impact public access by creating a continuous trail between White Housse Pool parking lot and the Green Bridge. This is our preferred solution.

Thank you for reading and considering our view.
Lynne and Phil Forester (Tomales residents)



Kenneth Fox
P.O Box 87 Point Reyes Station 94956

Rec'd
FEB 16 2007

14 February 2007

Park_Planning@nps.gov
Attn: Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Comments on Giacomini Wetlands Restoration.

Dear Don:

Thanks for the hard work on this plan. I wanted to add a personal note as well. As you know, I worked a long time to get people out of their cars and have a decent alternative to the motorized method of transportation. I firmly believe that people will be more appreciative and have better understanding of nature if you get them out of their cars and into nature. I know that there are impacts to all our activities, but the impact of automobiles is seriously underestimated. I strongly support both the restoration both as it's benefit to species habitat and development of a formal trail for educational value for the public. Informal trails also have their purpose and can be accommodated in some areas.

I support a modified version of Alternative C. You have struck a good balance in general with Alternative C, and that it is really the "preferred environmental alternative" than considering that it calls for a huge amount of restoration and at the same time includes educational opportunities and allows basic transportation for non-motorized transportation, something that many of the self-crowned environmentalists seem to ignore as they drive gas-guzzling pollution spewing SUVs to take care of their second or third properties or drink PC Latté's.

Considering that the Giacomini will retain the old duck clubhouse and road to it for at least another 25 years, it makes good sense to have that be an area that the public can feel free to use and monitor activities around the old clubhouse. Remember that the public was swindled by a convicted war-time profiteer who grabbed the land and had the public pay for illegal reinforcement of his levees, and after all that the public had to pay over 5 million dollars for the land,

I recommend implementing Alternative C, with the following emphasis:

1. Make elimination of the northern transecting dike of the western pasture highest priority.

2 Build a full-spanning bridge over Lagunitas Creek as soon as monies become available (we note that those monies are coming from a different source than restoration fund. Those who say that those monies would be more wisely spent on improving the connectivity between the Olema and Giacomini marshes are being disingenuous, Think of how much money it would take to remove the levee road entirely?. Undertake the restoration and development of the trail concomitantly. Furthermore, the funding necessary to alter Levee Road in order to fully restore connectivity between Bear Valley/Olema Marsh and Lagunitas Creek may be much more than the pedestrian bridge.

3. Extend the trail along the western pasture utilizing both the park lands and the county easement on SFD. Extending western perimeter trail to allow basic transportation and promote education regarding the importance of transitional wetlands. (Remember, a great number of exiting trails in the park pass over or are within wetland areas. E.g. Muddy hollow trail, bear valley trail, Estero trail. And the Limantour road was built by the park through some pretty sensitive habitat in the name of fulfilling park priorities)

4. Utilize the old Inverness Park post office as an educational tool for teaching both history and the importance of the restoration.

5. Include the access point parking area at the farm worker housing on Mesa Road and maintain existing ranch road as an viewing access trail. Consider raising Mesa Road on a causeway rather than digging new alignment for Tomasini Creek. (Eliminate Mesa Road altogether in favor of lighter use trail?...)

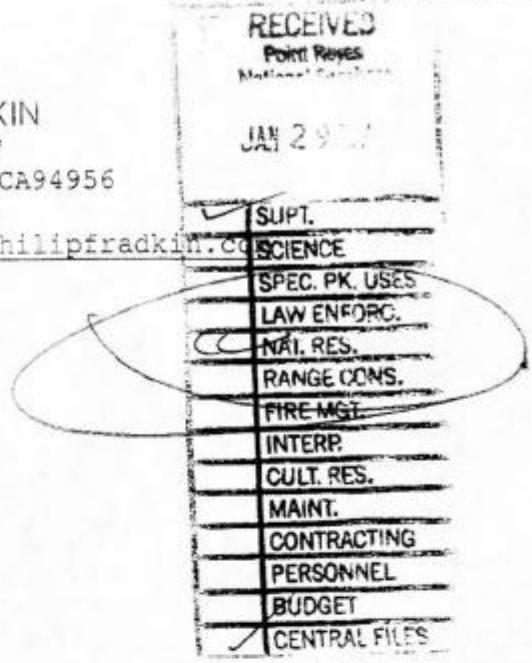
6. Buy the property at the corner of B street and Highway One for a parking area and have a trailhead there that connects to trail toward the dance palace. The since visitors and residents can easily walk from town just as the farm worker housing site where there is very good pedestrian access from Mesa Road. Michael Mery is wrong about this, many people walk along mesa road Maybe he doesn't want the general public to know that he lives near there? The parking lot at the old Ken Parr/ Bear Valley Stables is underutilized and I have not seen or heard much problems from it, so I don't see that there will be a great problem with other smaller parking lots.

Thank you for the opportunity to comment.

Ken Fox

Lorraine Parsons

PHILIP L. FRADKIN
P. O. Box 817
Pt. Reyes Station, CA94956
415-663-8733
philfrad@earthlink.net/www.philipfradkin.com



Supt. Don Neubacher
Attn. Giacomini Wetlands Plan
Pt. Reyes National Seashore
Pt. Reyes Station, CA 94956

January 26, 2007

Dear Don:

Great planning job!

I favor Alternative C rather than D for the following reasons. I don't agree that D is the most environmentally sensitive alternative. The more extensive grading will be disruptive to wildlife and humans, the transition from marsh to grasslands is a more natural environment both in visual terms and as a way to provide habitat for more diversified species, and there is no way that you are going to control the outflow of Tomasini Creek in big storms, regardless what course you choose for it. Humans are part of the environment too, and the bridge will be an environmental enhancement in terms of the leisurely pleasures of walking and biking and diminished use of vehicles for those of us who live in West Marin.

I would only add, as I have at each workshop and hearing, that it makes no sense to provide a huge, new refuge for waterfowl and still permit hunters to set up on the northern edge and bang away at the incoming ducks.

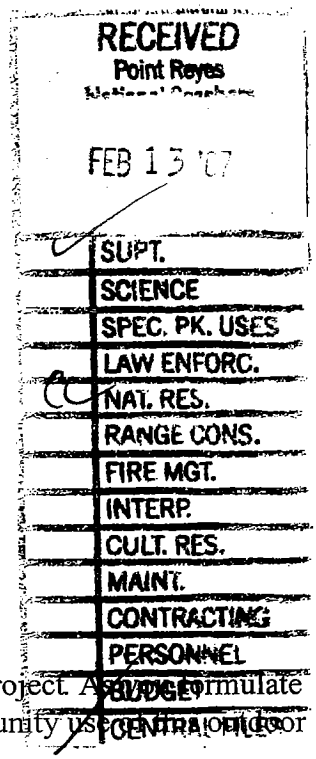
Sincerely,

Philip L. Fradkin

The Dance Palace
<dance@horizoncable.com>

02/13/2007 11:55 AM
PST

To: park_planning@nps.gov
cc: wbuxbaum@svn.net
Subject: Giacomini wetlands restoration



Don Neubacher
Point Reyes National Seashore
Point Reyes, California 94956

February 13, 2007

Dear Don:

I am writing to you in regard to the Giacomini wetlands restoration project. As you formulate your plans, I hope you will take into consideration a long-time community use of the outdoor area: that of the children in Dance Palace Camp.

Generations of kids have participated in this camp (the only ongoing day camp in the Point Reyes/Inverness area) since its inception in 1980. Over 70 children ages 6–14 attend camp each summer, with 35% of those kids receiving scholarship assistance. Activities include art, ceramics, theater, music, martial arts, and more; but one of the very basic activities at camp is called outdoor adventures – and these adventures have always centered around hikes and programs in the area around the creek.

Our outdoor adventure program expands the knowledge of our campers about West Marin's unique ecosystems; teaches basic information about local wildlife, plants, and the ecological diversity of our local riparian areas as well as the challenges of conservation and preservation; and encourages West Marin youth to take a greater interest in science and environmental stewardship. Age appropriate activities reinforce their school-year biology studies and teach them about habitat requirements, life cycles, creek ecology, and each child's important role in helping preserve our special local environment.

Every day during the camp season for the past 26 years, kids from camp have walked down to the creek from the Dance Palace, using the access at Third Street. This magical outdoor space has indeed been their extended playground and learning area. I strongly urge you to consider including public access to the wetlands area that is quickly, easily, and safely accessible to the kids in Dance Palace Camp (and indeed for all users of the Dance Palace Community Center) as you move forward with your plans for the Giacomini wetlands restoration.

Sincerely,

Carol J. Friedman
Executive Director, The Dance Palace Community Center

LYNNFRANCO@aol.com
02/12/2007 05:56 PM EST

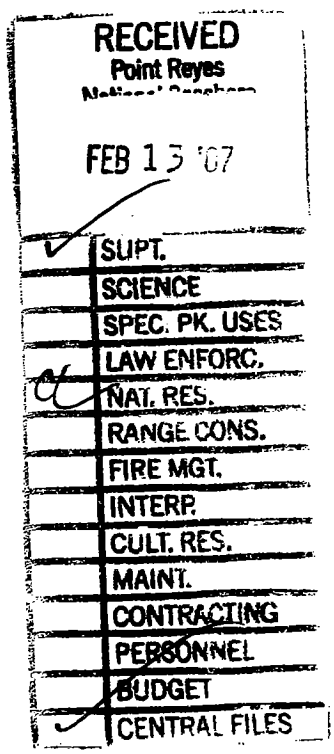
To: Park_Planning@nps.gov
cc: LYNNFRANCO@aol.com
Subject: Giacomini Wetland Restoration Project - Comment

Dear Sir; You and your staff are to be commended for the effort necessary to procure and develop the plans for restoring the Giacomini wetlands. Plan C seems unique in providing significant public access while maintaining 99% of the ecological benefit.

We have a home on the wetlands outside the boundary area marked red in your presentation There is question of concern which would effect a small number of homes on the wetland between Inverness Park and Inverness We were hoping for clarification about your description of increased potential for flooding due to an elevation of.6 to 1.6 ft of water during a 12 year flood event on the western side of the restoration Since our home foundation is on poles in the mud flats and the Jan 1st 2006 waters reached within a few inches of flooding the house we wanted to know did your Hydrologists evaluate the expected rise in water outside the immediate adjacent private properties Your report indicates the immediately adjacent homes are on raised fill Since ours is not; did you consider the possibility of mitigating any danger to our and other homes at greater risk of flooding? What would be the expected drop off in water highth as one moved closer to Inverness? Do you consider the Jan 1st 2006 flooding as a 12 year event. Thank you for your consideration and reply.

Nathan Kaufman 510-5482500
e-mail lynnfranco@aol.com
12660 Sir Francis Drake Blvd, Inverness Ca
P.O. Box 567, Inverness Ca,

94937



llouisefranklin@aol.com
02/12/2007 11:47 AM
EST

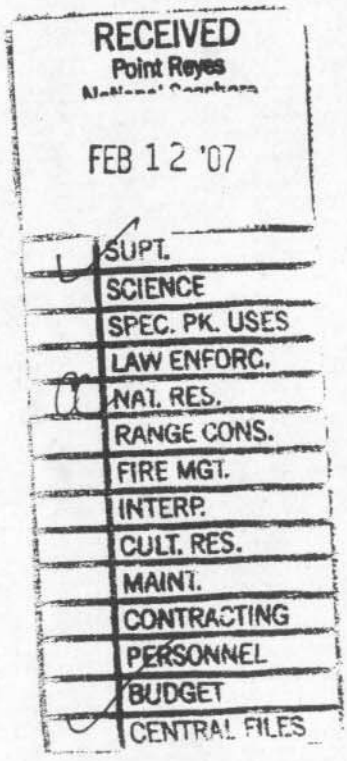
To: Park_Planning@nps.gov
cc:
Subject: Giacomini Marsh input

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

Dear Don: I want to cast my vote for Plan D. I feel strongloy that there is quite enough public access, and the primary goal should prioitize full wetland restoration. Wetlands are extremely precious and vulnerable ecosystems and I am especially concerned about ground nesting birds such as the plover. Everything and anything that assists wild species here is vitally important. Easy public accessibility means dogs, and more dangers for vulnerable species. The public comes here to view and enjoy and become educated about wild life and wild lands. Lets ensure that this area becomes a prime example of a true wetland. This will, in the long run, contribute the most to the goals of the Point Reyes National Seashore. Thank you for all of the work you and your staff have done. I most appreciate your efforts to provide us with all of the variables.

Sincerely,
Louise Franklin
Resident, Inverness

Check out the new AOL. Most comprehensive set of free safety and security tools, free access to millions of high-quality videos from across the web, free AOL Mail and more.



"Tom Gaman"
<tgaman@forestdata.com>
02/14/2007 06:13 PM
PST

To: <pore_planning@nps.gov>
cc:
Subject: Tomales Bay Wetlands Restoration

14 February

Don Neubacher

Alternative D sounds to me like the best option. There are few coastal wetlands in California, and the south end of Tomales Bay is under increasing visitor pressure every year. While we have lived in Inverness the visitation has increased dramatically. Therefore I support the "environmentally preferred alternative". Thank you.

Tom Gaman

RECEIVED
Point Reyes
National Seashore
FEB 1 ? '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Ann Nelson

01/23/2007 03:10 PM PST

To: Lorraine Parsons/PORE/NPS@NPS
cc:
Subject: Fw: From NPS.gov: Giacomini Wetlands

Do we have a draft, or final, timeline? Would you please copy me on response or let me know if I may do anything to assist.

Anni

aleta@lmi.net

01/23/2007 03:47 PM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetlands

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

I write for Bay Nature magazine and we want to track the progress of this project. Can you please tell me the timeline once the public comment period is over? What are the next steps?

Thank you,

Aleta George Ear to the Ground, Bay Nature Home office: 707.429.3529 E: aleta@lmi.net

"Ann"
<agessert@svn.net>
02/12/2007 07:11 PM
PST

To: <pore_planning@nps.gov>
cc:
Subject: preference for wetlands

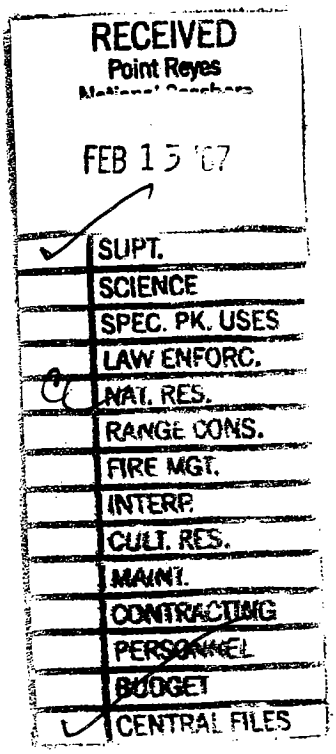
To Whom.....

I would like my voice counted among those who support Plan D for the Giacomini Wetlands.

I support the most environmentally protective plan, even if it means some inconvenience to humans and human traffic. I support the most extensive protection of the wetlands that is possible. However, I do also support footpath connection between the green bridge and the white house pool area, which I believe means a bridge being built.

Thank you for adding my thoughts to the many you have already received

Ann Gessert
Inverness
669-1544



"Aaron W. Gilliam"
<agcypress@gmail.com
>

02/14/2007 09:04 AM
PST

To: park_planning@nps.gov
cc:
Subject: Wetland restoration comment

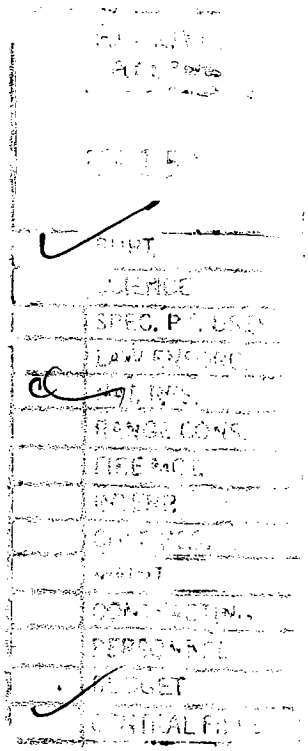
I am a community member in Pt Reyes Station and i hope that the parks will choose a plan that provides human interaction with the proposed wetlands. Humans have been part of this landscape for much longer than or short period of European colonization and should continue to be a part of the land so long as we participate in a conscious way with respect for the other native flora and fauna.

I would also like to share my sentiment of frustration on the fact we are about to loose some of the best agricultural land in the entire county. Yes the birds, frogs, fish, plants and many others will inherit the space to live in, but i find it a bit hypocritical to hear all the people who are ranting on about "localization," and "self-dependent economies" turn around and demand that their productive (or potentially productive) fields should be returned to the animals that have evidently adapted to the agricultural border around their wetland homes.

thank you for reading my comments,

sincerely,

Aaron Gilliam



Ms. Joyce Goldfield
P.O. Box 581
Inverness, CA 94937

ASPCA

My choice of Alternatives for Giacomini wetland restoration would be – D – with the exception of having Pt. Reyes Station connected to White House Pool via a bridge over Lagunitas Creek (at old summer dam site) for children + adults to have commute (as proposed in alternative C)

Joyce M. Goldfield

Comments
Giacomini Wetlands
Restoration Project

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP
CULT RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

John Gouldthorpe
<john_gouldthorpe@yahoo.com>

02/14/2007 06:44 AM
PST

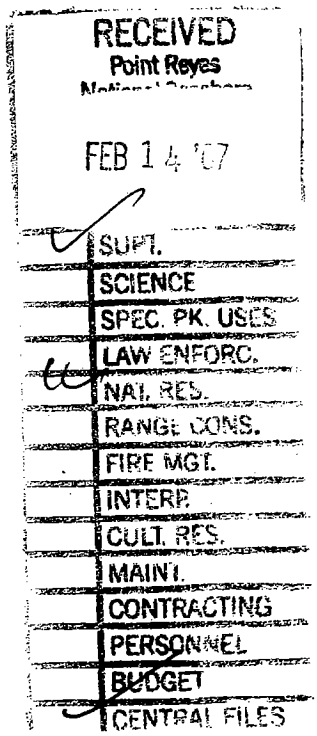
To: park_planning@nps.gov
cc:
Subject: Giacomini Wetlands Restoration Project

To the Giacomini project management team:

After reviewing the EIR and visiting the sites proposed to be developed under Alternative C what makes the most sense to me is Alternative D, with the addition of a bridge across Lagunitas Creek.

Thank you

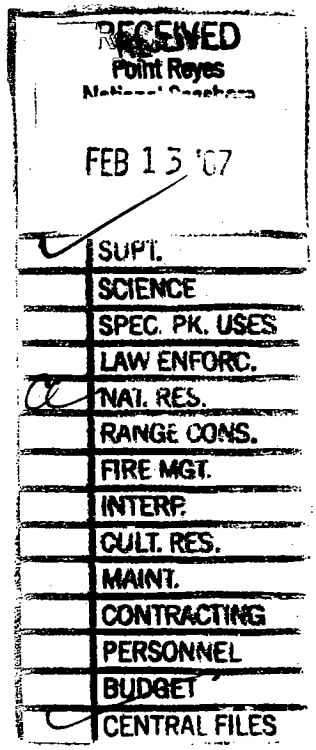
John Gouldthorpe
PO Box 879
Marshall, CA 94940



Ann Sheree Greenbaum
<asg_yoga@yahoo.com
>

02/12/2007 02:33 PM
PST

To: park_planning@nps.gov
cc:
Subject: wetland restoration



Dear Don,

I very much appreciate the efforts of the Park to thoroughly consider appropriate ways for administering the restoration of the Giacomini property.

It is clear to me that it is imperative for the restoration to be the most ecologically sound approach possible. Given the proposals currently being considered, I implore you to choose Plan D.

I would also appreciate your consideration of the idea of burying the utility pole lines along the levee road and the land atop them becoming a foot path from Inverness Part to Point Reyes Station. I was told this idea was mentioned at the last public meeting regarding the restoration along with a funding source for such a project.

I offer my gratitude to you and your staff for your conscietious determination in this matter.

Sincerely,

Ann Sheree Greenbaum

Need Mail bonding?
Go to the Yahoo! Mail Q&A for great tips from Yahoo! Answers users.
http://answers.yahoo.com/dir/?link=list&sid=396546091

WETLAND RESTORATION PLANS A, B, C, D

Since moving to Walnut Place Senior Housing in Pt. Reyes Station five years ago, I found it odd that you could not walk out into our wonderful, nearby parkland without walking on the road. I tried this numerous times—along the Levee Road (Sir Francis Drake) and Hwy. 1—and found it dangerous to do this and also not very pleasant.

What I and others who either don't drive or don't care to hop in a car every time we wish to be out in a natural (not man-made) environment really need are paths into natural habitats in the area.

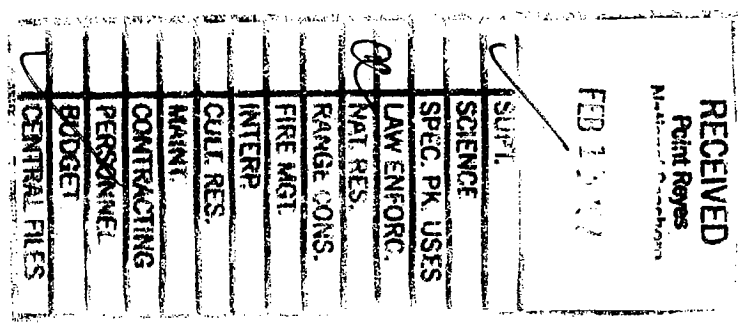
I like the plans that include a bridge across Lagunitas Creek and a trail that connects it to the one that extends east of Whitehouse Pool. It could be if "D" is the preferred one----it could include the bridge and path along this creek....as some organizations (Bicycle group, Sierra Club) have advocated.

We walkers and bicyclists need safe paths within a natural setting. Please do include them for we who love to be in nature and love to walk or ride bikes. Think of the youth and the seniors.

Sincerely,

Gail Greenlees

Gail Greenlees (Walnut Place resident)
PO Box 567
Pt. Reyes Station, CA 94956



Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Please be sure to include the Southern Perimeter Public Access Trail with Bridge to connect up to Whit House Pool & beyond to Inverness Park. There are those who do not drive (whether young or elders) and wish to walk in a natural setting & not on the road which is taking your life in your hands. (The levee Rd)

Gail Greenlees
PO Box 567
Pt. Reyes Station
CA 94956

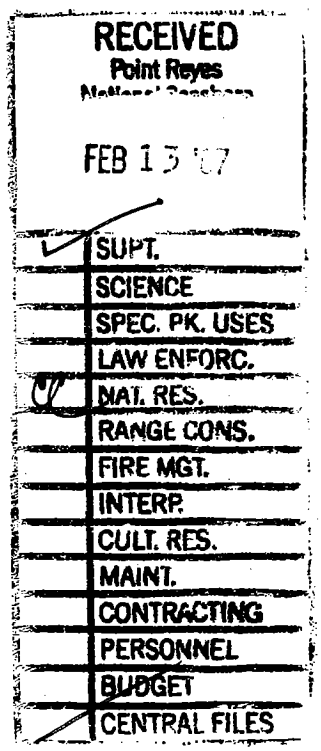
Sadja Greenwood
<sadjagreenwood@yahoo.com>

02/12/2007 06:39 PM
PST

To: Park_Planning@nps.gov
cc:
Subject: my vote is for plan D

I second the remarks by Michael Mery in his letter to you. Sadja Greenwood, 440 Birch Rd. Bolinas.

The fish are biting.
Get more visitors on your site using Yahoo! Search Marketing.
http://searchmarketing.yahoo.com/arp/sponsoredsearch_v2.php



TonyGrif@aol.com
02/06/2007 11:33 AM
EST

To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: Laguinitas Creek - Alt D

I am a registered voter and resident of Inverness CA and I am in favor of what is currentlly call "Alternative D", which calls for no trail and no trail over Laguinitas Creek. The proposed bridge and trail are inconsistent with "original wetlands" purpose of the project.

In short, I am against Alternative C, which is reported to be the preference of your department

Anthony Griffin
2 Camerson
Inverness, CA 94937

RECEIVED
Point Reyes
FEB 6 -
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

doug@yosemitecreek.com
02/14/2007 09:42 AM MST

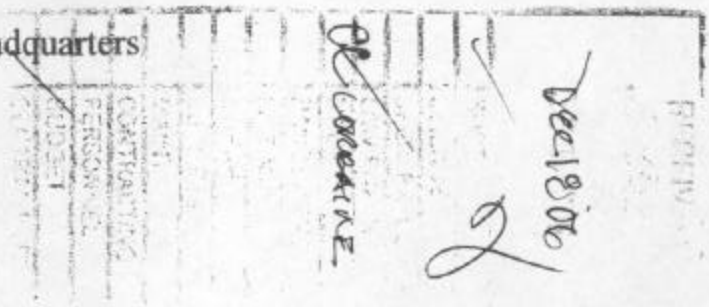
To: pore_planning@nps.gov, pore@yosemitecreek.com
cc:
Subject: Wetlands Recommendation

I would like to voice my support for Alternative D for the Giacomini Wetlands. Originally I favored C, preferring increased access, particularly at Mesa Road. As a resident at 65 Mesa Road and and as a walker I thought the easier access would be preferable, especially for those of us who live here. After talking with my neighbors I have changed my mind. The feeling here seems to be that bringing increased traffic and visitors to the edge of a residential area is not desirable and that access should be gained in areas away from residential areas so as not to impact those of us who live here. I am not against increased access for people coming here to visit but we should not increase their incursion into residential areas.

In addition, I would like to have a pedestrian bridge over Papermill Creek at White House Pool. Anything that makes travel between Pt. Reyes and Inverness Park safer for our children and ourselves should be encouraged. Done well, a minimal bridge would not have a deleterious effect on the environment. In the spirit of compromise, I hope the NPS will consider those of us who live here as part of the environment as well.

Doug Haner
65 Mesa Road
Pt. Reyes Station, CA. 94956
(415)663-8571

Point Reyes National Seashore Park Headquarters
Point Reyes, CA 94956



December 14, 2006

Superintendent:

My husband and I enjoy birding. During the recent high tide December 4 on a gorgeous morning we made our way out on to "Waldo's dike" to look for rails and other exciting birds pushed out of the wetlands and fleeing the herons and egrets. We joined an informal group of birders including locals like David Wimpfheimer and some members of Audubon Society who had come all the way from Santa Barbara. We spoke with the folks widening a portion of the dike along the creek and prepping it for replanting with native flora. We are all hoping that the portion of the dike we were using would somehow be salvaged for future nature lovers. Can you tell me what the plans are for Waldo's Dike and the public access to it off Sir Francis Drake near Drakes' View Street in Inverness?

I believe that continued public access would guarantee the bonding of people with you can stand out there at high tide and count 40 snipe flying by to dryer ground, watch rails being eating by egrets and great blue herons, and see your first ever Swamp Sparrow as we did, it comes to mean so much more. This is potentially a place for ranger led walks to teach people about the life hidden in the pickleweed. If the dike needs to be breached for the restoration project, could you include culverts or a bridge in the plan so we can still walk out there and feel ourselves part of the life of the marsh?

Thanks for your attention to this and for buying and restoring the ranch lands to wetlands!

Sincerely,

NPHanson

Nancy Prince Hanson 488-4202

PO Box 1184
Woodacre, CA 94973

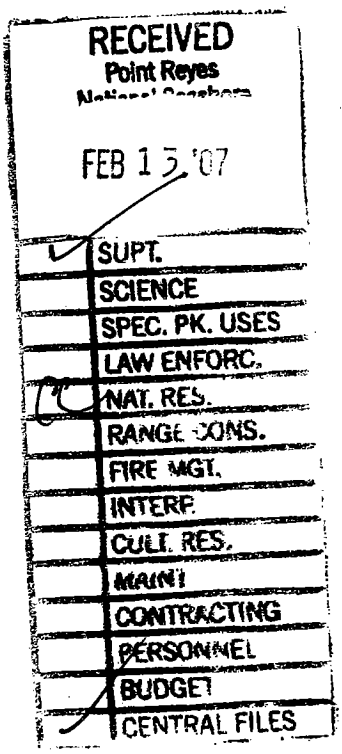
"Roger D. Harris"
<busirh@comcast.net>
02/12/2007 09:56 PM
PST

To: <pore_planning@nps.gov>
cc:
Subject: Support Alternative D for the Tomales Bay Restoration

NPS:

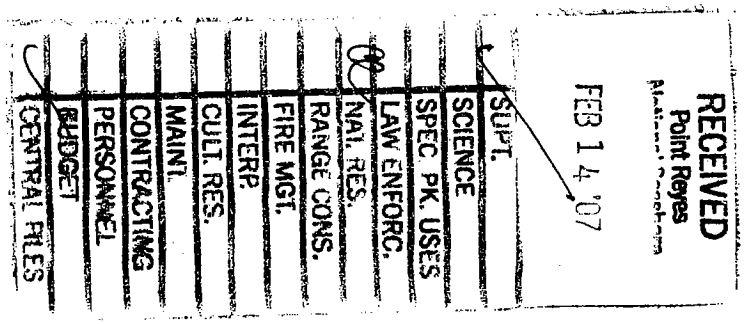
Please support alternative D for the Tamales Bay Restoration.

Roger D. Harris
10 Echo Ave
Corte Madera, CA 94925



I Mary Haines -
would like to see
- a pathway and
Bridge to Inverness
Park, alternative C
OR D with Bridge
& path

Mary Haines
2-14-07



February 12, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Giacomini Wetlands Restoration Plan - Comments on Draft EIS/EIR

Dear Don,

Having read and reread the excellent letters created by Jules Evens, Hathaway Barry, and Wiebke Buxbaum I know they have said everything I would write if I only could do it as well. Since they have paved the way, my message will be simple, brief, and to the point.

I live on the Point Reyes Mesa, Cypress Road, at the edge of the bluff overlooking the former Giacomini ranch lands. I have resided here for thirty five years. So, I know very well this special place under consideration.

We have a very serious mission to restore these wetlands. As you and I each stated during the public meeting, "The United States wetlands have suffered a 37% loss, while the wetlands of Tomales Bay have been diminished by 50%!

Frankly, I think the handwriting is on the wall, Don. Considering the global warming catastrophe confronting every living being we must do anything and everything we can to help control the impending worldwide disaster.

The most obvious, and therefore the first thing we can do for this restoration project is to keep it simple and restore every square foot we can. Bridges and new trails going almost no where are not necessary. We have a long way to go just to reach the United States statistic of 37% wetland loss, when we really should be striving for 100% restoration.

For the record, I am in complete agreement with the Point Reyes Village Association - Design Review Committee's recommendations.

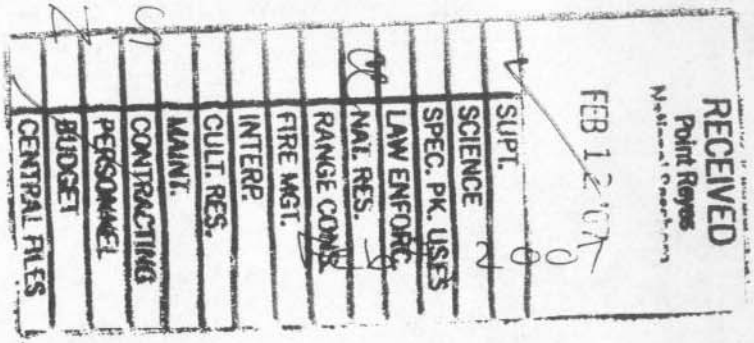
Very truly,

Patricia Healy
P. o. Box 429
Point Reyes Station, CA 94956

Superintendent P.R.N.S.

Point Reyes

CA 94956



Dear Superintendent —

Thank you for your thoughtful choices for the Giacomini lands —

I am in favor of # C — so we can still walk there — perhaps even bike + walk to Inverness Park —

However — I am very concerned that we may lose our ~~off~~-leash DOG walking priveledges — the blackberry tangle with it's labyrinth of paths and access to the creek are a joy to us owners and to our dogs — We are very diligent about cleaning up after our dogs.

Sincerely,

Susanna Henderson

Ms. Susanna Henderson
PO Box 39
Pt Reyes Sta, CA 94956

Sunday

Don:

An ADA trail to a prominent view on the E. shore of MARSH – FABULOUS!

Congratulations, thank you, way-to-go! What a great visitor-use addition. That guy in a Winnebago at the Pine Cone can now take his disabled wife for some easy bird-watching from a world-class view-spot!

May Plan C go forth unimpeded by trailer-trash sentiments from NIMBY Mesa Rd!! They've got huge back yards and 20-ft of brambled embankment protecting them, even if people walked on the old ROW. (Yes, I did leave a Comment Card.)

I, of course, will/am/would lobby for connection to Martinelli area & could defend a "primitive footpath" connecting 2 used areas as not increasing the "moderate use" intended for the Marsh. Footsteps won't hurt any thing along this disturbed E. edge.

Your clever compromise is so good that I can WAIT (& try later?) on "connection" via old ROW.

(Please) give me a confidential "hint" (Yes, No?) at Box 623 or 663-8122? If, in 3yrs, a private donor to create a connection thru Seashore Foundation might meet consent (not objection) from NPS.

(bcrm repair & culverts, "primitive footpath", exclusionary signage - stay-on-trail, etc., etc)

Happy New with Plan C! Jambo! Good Luck!

– Bob Hollenbeck
Hi to Patty

JAMBO, Don Neubacher....

Bob Hildreth
Box 623, PR St.
663-5162

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Natl. Park's are for preservation & use ("enjoyment") of the people! The old railroad ROW belongs to all!

Please add any additional issues that were not brought up at this meeting:

ⓔⓔⓔ ne

My issue: Visitor Use at old farm access/housing area @ Mesa Rd crossing over creek.

I strongly support Plan C's "facility/view/ADA trail" there (I also support Plan B's connector trail up to Coastal Access/Martinelli property.)

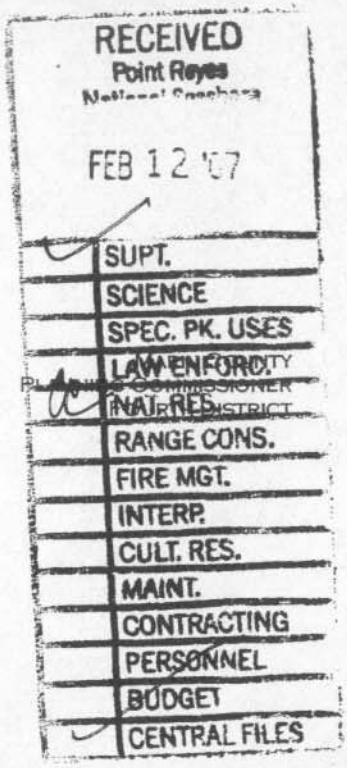
If plan C fits most other environmental aspects best, couldn't same connector trail be put in C?

If not, but ADA trail to View Spot is planned, could a PRIVATE DONOR talk to NPS and Seashore foundation?? (Ignore MESA RD. selfish concerns).

("primitive path" on old ROW from ADA/View to Martinelli Access)

WADE B. HOLLAND

POST OFFICE BOX 87
INVERNESS, CA 94937 USA
(415) 669-1631 • FAX (415) 669-1460 • wade@svn.net



February 9, 2007

Superintendent
Point Reyes National Seashore
Attn: Giacomini Wetlands Restoration Project
Pt. Reyes Station, CA 94956

After a more-than-cursory reading of the DEIR/DEIS for the Giacomini Wetlands Restoration Project, attendance at the public workshop on January 25, and careful consideration of the project and the Alternatives, I wish to express my support for proceeding with the Project on the basis of implementing **Alternative D**, the environmentally preferred alternative.

However, I also feel that Alternative D should be amended to **include the bridge over Lagunitas Creek** to connect the two segments of the Green Bridge to Whitehouse Pool trail. Without the bridge connection, you would essentially have two orphaned trail segments that go nowhere, at the same time that you would be forcing the through users of the route to resort to the shoulder along the Levee Road. I believe strongly that the bridge is essential, but in conjunction with adopting (and as an amendment to) Alternative D.

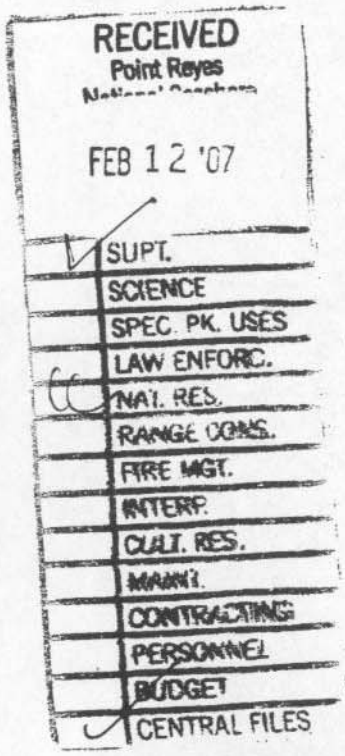
Cordially,

Wade B. Holland

"Madeline Hope"
<hopexing@HorizonCable.com>
02/12/2007 09:20 AM
PST

To: <park_planning@nps.gov>
cc:
Subject: Alternative D with a bridge connector to PRSta

Please know that I am in full support of alternative D with the bridge connector to PRSta For the safe route to school for young people and local citizenry we need more bike AND pedestrian paths. Thank you Madeline Hope Shoreline Unified School District Trustee



Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Progress Reports to the community.
How are things going?
Will NPS be providing this info
to the WM community?

M. Hogan

Cxl777@aol.com
02/14/2007 09:03 PM
EST

To: Park_Planning@nps.gov
cc:
Subject: Giacomini Marsh

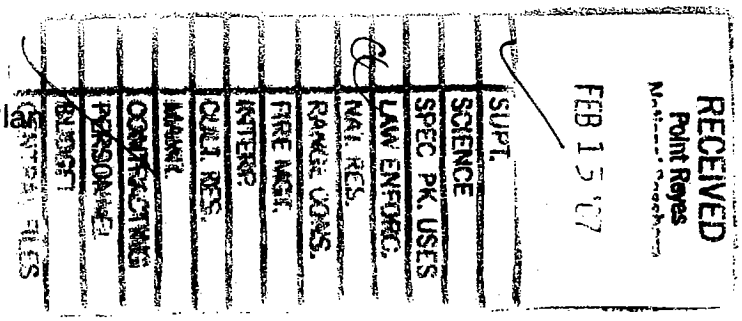
Superintendent Don Neubacher:
Point Reyes National Seashore
Point Reyes Station, CA 94956

The undersigned would like to see "Alternative D" implemented.

Sincerely,

Drayton and Joyce Howe
Point Reyes Station

Superintendent
Point Reyes National Seashore
Point Reyes Station CA 94956
Attention: Giacomini Wetlands Restoration Plan



February 9 2007

Louis Jaffe <louis@overlookmedia.com>
PO Box 235
Point Reyes Station CA 94956

To the Giacomini project management team:

I am a homeowner on the Point Reyes Mesa bluff who attended the January 5 2007 informational meeting on the Giacomini Wetlands restoration plan, and I have studied the full EIS / EIR.

Regarding the choice of alternative, I agree with the advocacy groups including the Sierra Club, the Environmental Action Committee of West Marin and others:

Alternative D, the environmentally preferred alternative, would be my preference. However, I would like to see the pedestrian / bike bridge over Lagunitas Creek added to Alternative D (as described in Alternatives A through C), to connect the important southern perimeter trail corridor.

If it's not possible to add the bridge to Alternative D, then I would prefer Alternative C.

Regardless of which alternative is finally implemented, I would like to bring your attention to an area of invasive vegetation not currently identified in the project mapping that urgently needs clearing. It is along the Tomasini Creek slough, immediately south of the Martinelli Ranch.

This backwater slough with its levee is retained in all planning alternatives as habitat for the endangered Tidewater Gobi. Within view of my property on Point Reyes Mesa bluff, eucalyptus trees have taken root and are growing to large size on the levee itself. They may threaten the structural integrity of the levee.

On the historic railroad grade along the east side of Tomasini Creek a dense grove of eucalyptus has become established, continuing on private property ascending the bluff. French broom infestation is also extensive in this area.

I've spoken to the other adjacent property owners, and we would like to coordinate efforts with the Park Service to remove invasives and restore native habitat on the privately owned section of the Point Reyes Mesa Bluff bordering the historic railroad grade.

Please add removal of these invasives from the Tomasini Creek levee and historic railroad grade to any restoration plan. To document this issue, a map and photos of the area described are included with this letter.

Thank you very much

Louis Jaffe

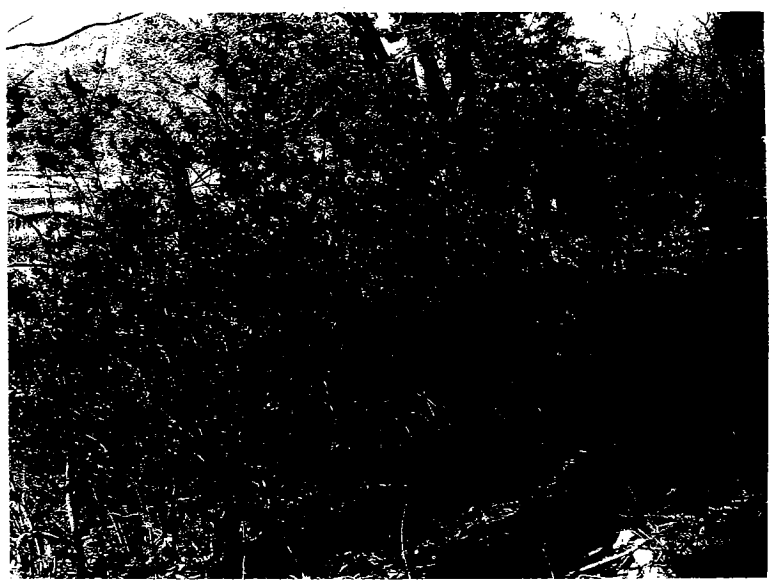
Giacomini Wetlands restoration area:
Invasive non-native vegetation on Tomasini Creek levee and historic railroad grade, adjacent to Point Reyes Mesa Bluff, off Overlook Road (near boundary of Martinelli Ranch).

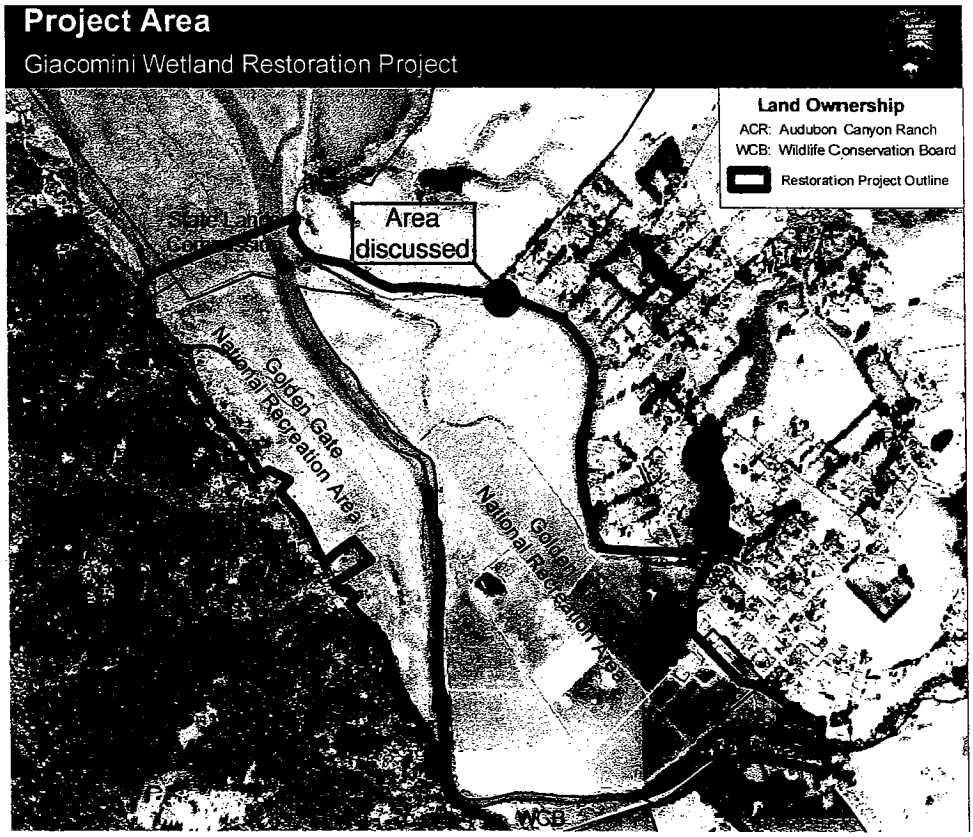
Photographed January 29, 2007 by Louis Jaffe.

Eucalyptus trees on levee, railroad grade, and adjacent private property.

Recently fallen sapling on bank of slough. Larger tree in background fell across slough, bridging from east bank to levee.

Closeup of eucalyptus on levee. High tide in the slough inundates the base of the tree.

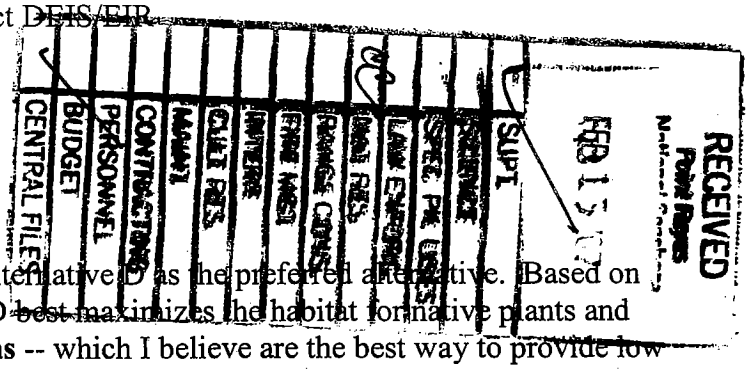




Detail from Project Area map, Giacomini Wetlands project EIS / EIR with emphasis added to pinpoint area of invasive plants on berm and historic railroad grade

Current Google Earth imagery showing eucalyptus on Tomasini Creek berm and Point Reyes Mesa bluff. Martinelli tract at upper left; Overlook Road mid right.

ATTN: Superintendent
Giacomini Wetland Restoration Project DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956



Dear Don,

I am writing to support selection of Alternative D as the preferred alternative. Based on the alternatives offered in the DEIR, D best maximizes the habitat for native plants and wildlife, and D provides **viewing areas** -- which I believe are the best way to provide low impact public access, consistent with a sound environmental educational message.

My remaining comments are aimed at strengthening the definition of D to

> Assure that D is the best environmental alternative
> Assure that public access in D is satisfactory, and at least from some perspectives, superior to the other options
> Improve the evaluation of alternatives to fairly consider Alternative D.

Add an ADA compliant trail to Alternative D

Probably the most important and easiest way to enhance Alternative D is to put in the ADA compliant access included in alternative A. D already includes the Dairy Mesa viewpoint. To enhance D use the option as defined in A: " A decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay... This viewing area would consist of simple facilities such as benches, picnic table, and interpretative exhibits." (page 49)

Alternative D is faulted for lack of ADA-compliant access in several places where the alternatives are compared:

> Criterion 5 of section 101(b) and 102(1) - "Alternative C would appear to offer the best benefits … **including an ADA-compliant access component**" (see page 96)
>
> The Preferred alternative selection: "Alternative C offers the best combination of restoration and public access benefits … and **incorporates an ADA-compliant access component.**" (see page 96)
>
> Table 1: Incorporate opportunities for the public to experience and enjoy the restoration process – In alternative D "there would be no through-trail or **ADA-complaint access components**" (see page 99)

Those statements are an unfair evaluation since it easy to add an ADA-compliant component to D without sacrificing the environmental benefits of D.

Impacts of spur trails and a through trail

There is much discussion in the DEIR about the desirability of having spur trails and a through trail. Many people would like spur trails and many would like to ride bikes from Inverness to Point Reyes Station. But, these desires do not enhance the restoration and they are not necessary for the public to experience and enjoy the restoration process.

Despite all the attention given to spur and through trails in the DEIR, the negative impacts of the recommended trails are omitted or the discussion is incomplete. Here are some of the impacts that should be considered in the final EIR:

> Dogs in the wetlands and buffer areas. Where there are trails, there will be some who abuse the privilege and let their dogs, even encourage their dogs, to disturb wildlife and some dogs will carry diseases into wildlife habitat.
>
> Disturbance occurs along trails especially ones that combine multiple modes of travel
>
> Habitat is directly impacted by trails and their maintenance. Most of the spur trails intrude in the SCA riparian areas protected in the LCP (There is no discussion that I could find of this conflict of Alternative C and D with the LCP).

I object to the portion of the south perimeter trail included in both alternative C and D. (Creation of Southern Perimeter Spur Trail from Point Reyes Station to Location of Former Summer Dam including a new entrance area at Green Bridge County Park). This area has riparian habitat and has the potential for improved riparian habitat and associated buffer zones. This area should be restored for maximum habitat value and flood protection values. Planning the south perimeter trail through here I think violates the guideline on the project's purpose: **"public access opportunities should not conflict with the project's purpose of restoring natural hydrologic and ecological processes and functions"** (page 30)

About two thirds of that south perimeter trail along the east pasture falls within the SCA/LCP riparian zone and the graded entrance area is entirely located within scrub-shrub riparian habitat, designated as CDFG Riparian (see figure 34). Degrading these riparian areas is not discussed anywhere in the DEIR, so far as I could see.

What is appropriate and satisfactory public access?

Viewing areas will allow people to enjoy and experience the restoration without intruding into it. An associated interpretive message can reinforce the need to protect wildlife and habitat, and minimize disturbances.

If the spur trails are eliminated from Alternative D, public access still will be available at three viewing areas:

Easy access at the west end of the existing north levee
Hike in, trail access to a viewing area along the existing Tomales Bay Trail at the top of Railroad Point
Dairy Mesa viewing area (with ADA-compliant access as discussed in this letter)

These access points and trails satisfy the objective of the project: "The Park Service and the CSLC have committed to incorporating opportunities for the public to learn about the value of wetlands, the problems facing Tomales Bay, and the restoration process through trails, viewing areas, interpretative exhibits, and volunteer/educational opportunities." (Page 12)

Excavation of the south west corner of the east pasture

Alternative D includes a restoration step titled: Excavation of Southwestern Portion of East Pasture to Intertidal Elevations (Figure 16). This step appears to reach the limit of diminishing returns. 50,000 cubic yards would be excavated to convert 8.4 acres of grassland to tidal marsh. This spot will likely be inundated anyway as the sea level rises due to global warming. The excavation seems to offer a low return in a project restoring more than 350 acres of low-, mid- and high Tidal Salt Marsh (acreage from page 546).

Alternative D is supposed to describe the Environmentally Preferred Alternative, yet Alternative D is faulted for this excavation. See the comments comparing Alternative C and D; e.g. Alternative C " provides other environmental benefits by decreasing the amount of excavated sediment that would be disposed of off-site and thereby minimizing impacts on air quality, demand for non-renewable energy resources, and traffic in the local community and region." (Page 96) This fault in D is sprinkled through the evaluation in the same way that lack of ADA-compliant access is touted.

For the final EIR, I would expect the project planners to decide if the excavation is worth the effort. If it is, then it should be included and not listed as a negative. If it is not worth the effort because of the damaging side effects, then remove it from the environmentally preferred Alternative D. (Here is a similar kind of trade off to illustrate the process: Round-up would be a great way to kill invasive plants, but it would have terrible side effects in this wetland restoration.)

Starter channel

Alternative C includes a good restoration item: " Creation of New Lagunitas Creek Tidal Channel (Create Tidal Channel; Figure 14)" I did not understand why that is not included in Alternative D, too.

Another Starter Channel

Alternatives B, C and D include a restoration step of "Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee; Figure 11)" Since this is an area where the creek will rise over the bank, and hydrologists have debated whether Lagunitas Creek will "dramatically change course in the future by cutting through the East Pasture in this location." (page 56). Creating a starter channel here might be a win win step which creates flood reduction benefits and environmental benefits (more area for riparian habitat, some seasonal wetlands, and isolation of important riparian and buffer areas from disturbance). I don't know what the right size would be, but I imagine a 100 foot wide swale graded and planted with willows and alders, at around 10' NAVD88 and running west until the slope takes over. One of the objectives of the DEIR is stated as "emphasis was placed on those alternatives that would create the most sustainable and dynamic ecosystems." (page 30)

More Island-like Refugia

The DEIR describes high tide refugia of 1.1 acres at the north levee (page 36). This will be highly valuable habitat since shore side high tide areas are more subject to disturbance by land predators and human caused factors. I found it remarkable that the fill for the refugia had to be mitigated with wetland creation in a project that is creating about 350 acres of new salt marsh. low-, mid- and high Tidal Salt Marsh.

If 1.1 acres is appropriate for the existing salt marsh by the north levee, how much isolated refugia area is needed for the whole 350 acre salt marsh restoration? There are planned refugia on berms in the project, but there are no additional isolated, island-like refugia. If another 5 acres of such refugia were created, perhaps more excavated fill can be used on site, and valuable habitat can be created.

Figures and Tables in Chapter 4

It is difficult to follow the changes under the different alternatives. Chapter 3 has extensive figures and tables on existing conditions. There are no figures in Chapter 4 illustrating what the restoration might be like. The tables that are in Chapter 4 show summary qualitative descriptions such as "major beneficial". But, it is hard to make before and after comparisons when the data is scattered in the text.

Some of the ones that might be useful are listed here

> Table 10 shows acreage of most dominant vegetation type. There should be such a table for each alternative.
>
> Table 14 shows the estimated frequency of flooding and vertical flood elevation for key locations. There should be such a table for each alternative.
>
> A version of Figure 28 for estimating the height of the southern end of the east pasture after restoration.

I realize that the models have much uncertainty, but the text says that the conclusions are based on maps and predictions. "Analysis of potential changes in cover or areal extent of native vegetation communities with implementation of the various alternatives is based on maps that predict long-term changes in vegetation communities in the Project Area once equilibrium, or, more accurately, dynamic equilibrium conditions have been reached." (See for example, page 453)

Thank you for considering my comments. The DEIR contains excellent information and analysis. The project team should be commended for their work. I appreciate the opportunity to participate.

Sincerely,

Rick Johnson
PO Box 981
Inverness, CA 94937

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

I want to put my 2-bits behind Plan "C" — I think "D" is too radical - all the earth-moving will impact the environment detrimentally as much as any Restoration value it will achieve. But "C" is great! Thanks

Tom Killion - 51 Laurel, I.P. (PRS, 94956)

Richard Kirschman
<kirschman@marincounty.net>

02/12/2007 11:52 AM PST

To: "Frederick Smith, Jr., Environmental Action Committee of West Marin" <eac@svn.net>
cc: pore_planning@nps.gov
Subject: EAC Announcement: Giacomini Restoration Plan Letters Due by Tuesday 2/14

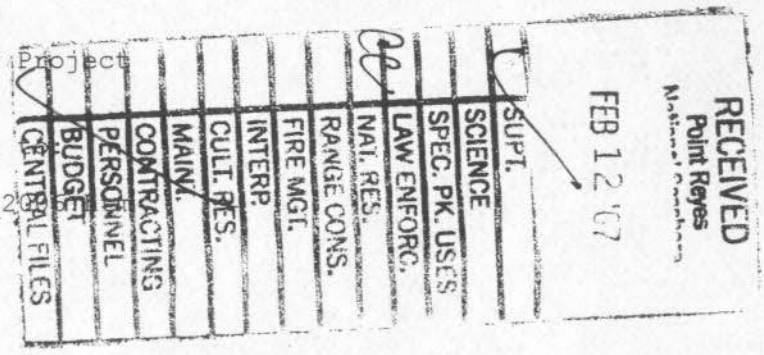
Fred,

The more public access the better. Access is very educational. Compared to the current status of these lands, either alternative "C" or "D" represents a gigantic step in the right direction.

Richard Kirschman

On Feb 9, 2007, at 2:12 PM, Frederick Smith, Jr., Environmental Action Committee of West Marin wrote:

> Dear Richard,
>
>
> This is Fred at the EAC reminding you that written letters on the
> Tomales Bay Wetlands Restoration project on the old Giacomini ranch
> are due by this Tuesday, February 14.
>
> The EAC is excited to see Point Reyes National Seashore's support for
> extensive restoration of the wetlands at the south end of Tomales Bay
> for the benefit of wildlife, including Coho salmon that spawn in
> Lagunitas and Olema Creeks. No matter what the outcome, the wetlands
> will be restored!
>
> But we are concerned about the Park's support of Alternative C, which
> calls too much public access at the expense of wildlife. The EAC
> supports Alternative D because it is the Environmentally Preferred
> alternative that provides for the most extensive restoration of the
> Tomales Bay wetlands. Also, please include in your letter whether you
> think that the bridge over Lagunitas Creek and trail connection
> between the Green Bridge and the White House Pool is a good idea.
>
> Remember, if the Seashore does not get enough support for Alternative
> D, we could end up with a restoration plan that includes too many new
> access-related impacts. So please write your letters in support of
> Alternative D to the address or e-mail below.
>
> Remember, we'll only end up with a plan we like if we ask for it.
>
> The Park is accepting written letters on this proposal until next
> Tuesday February 14. Please send your letter or e-mail to:
>
> Don Neubacher, Superintendent
> Point Reyes National Seashore
> Point Reyes, CA 94956
> Attn: Giacomini Wetlands Restoration Project
> E-mail: pore_planning@nps.gov
>
> For more information on the plan, go
> http://www.nps.gov/pore/parkmgmt/
> planning_giacomini_wrp_eiseir_draft_2
>



> Thank you all for your support of the EAC of West Marin.
>
> For Truth, Justice and the Riparian Way.
>
> Fred Smith
> Executive Director
>
>
> --
> Frederick Smith, Jr.
> Executive Director
>
> Environmental Action Committee of West Marin
> Protecting West Marin since 1971
> Box 609
> Point Reyes Station, CA 94956
> tel: 415-663-9312
> fax: 415-663-8014
> email: eac@svn.net
> http://www.eacmarin.org
>

"Jane Kriss"
<janekriss@gmail.com>
02/12/2007 11:58 AM
PST
Please respond to jane

To: pore_planning@nps.gov
cc:
Subject: Giacomini Wetlands

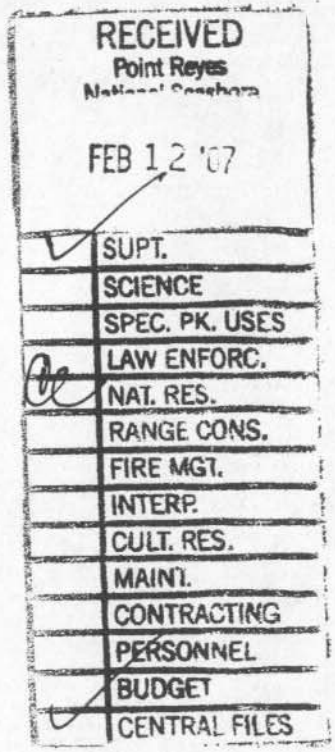
Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Dear Don:

I'd like to weigh in on the Giacomini Wetland restoration project.
I fully support Alternative D, since I would like to see the maximum amount of restoration possible. Horses and dogs especially do not belong in the wetlands or near the creek, and there would be a major enforcement challenge if a path were there ostensibly for people only. It's delicate, precious habitat, that we have the opportunity to save for the species that need our protection. Walking and biking paths (and we need both...) should be addressed as a separate issue, away from the waterways.

Sincerely,
Jane Kriss
Inverness resident

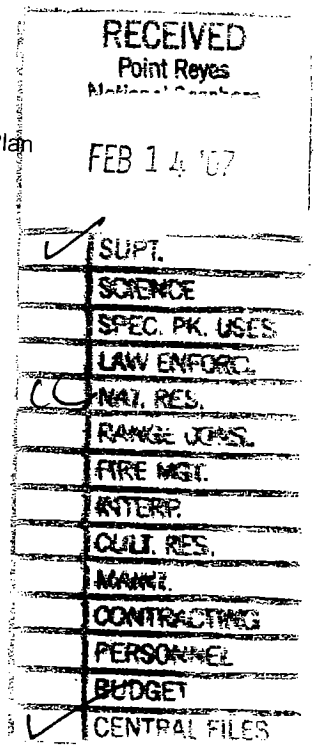
--
Jane Kriss
415.669.7331
www.janekriss.com



Rhonda Kutter
<rlkutter@horizoncable.com>

02/13/2007 10:35 PM PST

To: park_planning@nps.gov
cc:
Subject: Giacomini Wetlands Restoration Plan



Rhonda Kutter
PO BOX 876
Point Reyes Station, CA 94956
415.663.5451

February 13, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

Subject: Giacomini Wetlands Restoration Plan

Dear Superintendent Neubacher:

I am the Chairmen of the Committee for a Family-Friendly Point Reyes (CFFFPR). This organization was formed over a year ago and our primary goal has been to get a toddler playground in PRS-- it is scheduled to start perhaps as early as this spring as part of the County Restroom and Parking lot project. We are also actively persuing improving and expanding local walkways make them safer for everyone, especially children, parents with toddlers and strollers, and also the less abled.

I was very sorry that I could not attend the Park's Public meetings regarding the Giacomini Wetlands project. As a working parent of a five year old, evening meetings are a challenge--and illness prevented me from attending the last meeting, so my letter will be of a general nature, since I am not as familiar with all of the nuances of the various plans. I do appreciate all the time that has gone into investigating the various plans, as is apparent from all of your work.

Though I am not officially representing the CFFPR (we haven't had a need for a meeting recently) I would like to speak for many parents like myself, who live or visit Point Reyes Station on a regular basis for work, pre-school, school or shopping, and are disappointed that there are few suitable walks for parents with young children right here in town. The few we have are very short and the one public trail by the green bridge, as it is, is not safely accessible. Improving the pedestrian access by the green bridge and along Levee Rd. is an important task and should be done no matter what happens in the Wetlands project.

Although I am an active member of the Point Reyes Village Association, and know the design review committee has studied this far more than I, I would still like to see more pathways than they are recommending. Alternative C's Southern Perimeter Trail is something I have always dreamed about. How I would love to have a bridge to cross to White's Pool! And wouldn't it be wonderful to have two trails--on the Wetland's side that was geared more to pedestrians (and

perhaps equestrian too), and then have the bike access be part of the Levee Rd. widening project (or visa-versa)?

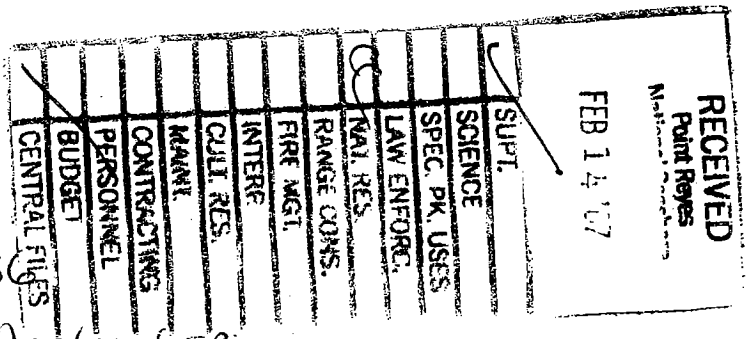
I do not have a strong opinion about the Mesa Spur Trail. However, I can see that if the Wetlands become a popular destination, it might be useful to have an parking area and entrance set aside for it, but I would like to see that be closer to town, if possible. As someone who frequently crosses Mesa Rd. at Lorraine, I find it can be a bit dangerous as it is--a lot of car travel too fast and increased use could make this even worse. I would like to see this part of the plan put on hold for now--perhaps it could be developed later if need be.

I like the idea of a dairy overlook with ADA access from town. The Point Reyes Station Village Association's suggestion of moving the access point to C Street seems well thought out to me. There is also interest in our community through the new West Marin Common's Group to improve the walkways/sidewalk along C Street to Highway One--which would make this approach even more inviting. It could also connect and attract visitor's more to the Dance Palace part of our town, which is a jewel often missed by first time guests to our village.

Thank you for you time. I hope my thoughts have been helpful.

Sincerely,

Rhonda Kutter



February 12, 2007
POB 223
Pt. Reyes Sta., CA 94956

Superintendent Don Neubacher
Pt. Reyes Nat'l Seashore
Pt. Reyes, CA 94956

Re: Giacomini Wetlands

Dear Don,

› Please record my support of [ALT. D without the bridge]

› Thanks to the presence of the National Seashore in our area, we are abundant in opportunities for hiking, biking, dog walking and horse riding.

› More and wider trails at the South end of the wetland project - riparian at creek edge - disrupt and discourage bird, insect, plant and animal behaviors.

› a bridge over Lagunitas creek will create a magnet for day-trip recreation.

› I do support a plan for viewing platforms in established edge areas.

› Let's watch the marsh develop with the least amount of presence and the most of our appreciation.

Thank you for recording my choice.

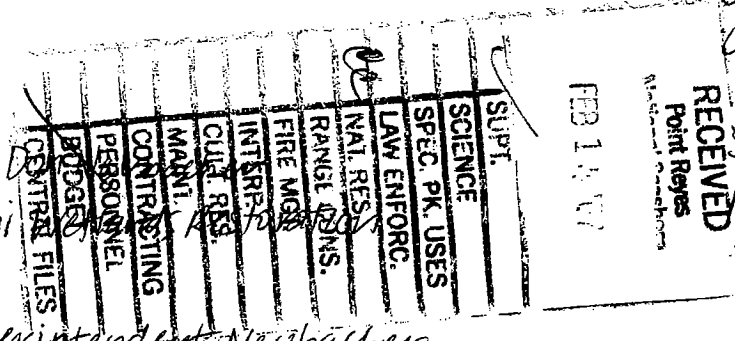
Sincerely,

Jan Langdon

copy to: Jon Jarvis
Regional dir.
Nat'l Park Service

[redacted]
Ms. Janice Langdon
P.O. Box 223
Point Reyes Station, CA 94956

Dona Larkin
Community Pathway
Committee;
Sustainable West Marin
Project Coordinator
Box 33, PRS 94956



Superintendent Don Neubacher
NPS * Giacomini Wetland Restoration Project

Dear Superintendent Neubacher,

I would first like to commend the park for its through study of the project and its willingness for public input in the process.

There are so many factors in the equation which makes it difficult to see clearly the best course of action, but weighing all considerations I can see why the park feels that ALT. C is the "preferred Alternative".

Alternative C offers excellent restoration to the wetlands while simultaneously focusing on the sustainability goals also formost in the overall objectives of the park. The creation of a trail to White House pool via a bridge over Lagunitas Creek is an intregal component of the alternative transportation goals in our community, and setting up the potential for the path to continue to Inverness park is crutial in this stage of development. Offering educational opportunities through expanded public Access and Interpretive exhibits will help to foster the environmentalists of our future.

Therefore overall I support ALT C with a few concerns:

1. How will the Aquision of the parcels along SFD in Inverness Park effect the outcome of either ALT C or ALT D?
2. Parking – the proposed limited parking at Mesa Road could be problematic due to its remoteness. A location closer to town would better serve the project and the community. Perhaps near the ranch buildings or the corner of Hwy one & B Street, which would link with the improved Access near the green bridge.

The necessary ADA component could be moved to the White House Pool parking lot.

(3) Currently the greatest non-ag use of the area between Hwy one and the Giacomini Ranch is by dog owners on their daily walks. There is an important need in our community for a location to exist where dogs can run freely. Historically this has been the location. A possible solution to have both protected wetlands and content pets & owners would be to fence an area perhaps at the edge of the project for off leash excercise of pets in town. Ideally pets would still be welcome on the trail as is currently the practice.

(4) Siltation of the bay could become a serious threat to habitat and water quality with the extensive excavation in both Alt. C & Alt D. What safeguards will be in place to prevent this?

(5) My study was in the executive summary and I saw no details of the bridge but heard many comments that the stature of the bridge was excessive. Any efforts possible to to scale it down somewhat would be well regarded, but the bridge is crutial.

* Please Note – While Alt C seems the best overall choice to me personally, I have also signed a document on behalf of the community pathway committee in colaboration with MCBC, the Sierra Club & Marin Access for Bikes. This group supports ALT D with the inclusion of the bridge & pathways of ALT C to Inv. Park & the Northern Levee. Our support for D is contingent upon the inclusion of the bridge and pathway.

Once again thank you for the opportunity for public input, it is a decision of critical importance.

Respectfully, Dona Larkin

"Kevin Lawson"
<yes@svn.net>
02/13/2007 09:36 AM
PST

To: <pore_planning@nps.gov>
cc:
Subject: Giacomini Wetlands Restoration Project

Don Neubacher,

To make this area really accessible and useful to the public, we need to be able to walk (or bike) from White House Pool to Point Reyes. A foot bridge across the creek where the dam used to be would be brilliant.

Thanks,
Kevin Lawson
Home: (415) 663-9210
Cell: (530) 545-2730
Fax: (415) 873-1949
P.O. Box 1293
Point Reyes, CA 94956

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

"Vicki Leeds"
<cabaline@svn.net>
02/13/2007 11:23 PM PST
Please respond to "Vicki Leeds"

To: <park_planning@nps.gov>
cc: <jon_jarvis@nps.gov>
Subject: Giacomini Ranch Property/Wetlands Restoration

To whom it may concern,
My vote is for a creative combination of alternatives "C" & "D". I would like to see the wetlands restored as much as possible to pre dairy ranch conditions, as well as to have the lowest impact pathway available connecting Inverness Park with Pt. Reyes Station.
It would be great if this pathway could be a safe alternative route for locals of all ages, whether they be walkers, bicyclists or equestrians.
Thank you very much for your consideration on this very important matter.
Sincerely yours,
Vicki Leeds
PO Box 398
Pt. Reyes Station, CA 94956
(Business owner in Pt. Reyes Station for 30 years, resident for 35 years, member of various local environmental organizations, & outdoor enthusiast)

RECEIVED
Point Reyes
National Seashore
FEB 14 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE OPNS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Ellen Lesli
<elesli@yahoo.com>
02/04/2007 01:33 PM
PST

To: park_planning@nps.gov
cc: jon_Jarvis@nps.gov
Subject: Attn: Giacomini Wetlands RestorationPlan

RECEIVED
Point Reyes
FEB 6 - '07
SUPT.
SCIENCE
SPEC. PK USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Ellen Lesli
PO Box 306
Inverness, CA 94937

Email : elesli@yahoo.com

Feb. 4, 2007

Park Planning – Jon Jarvis
Re : Giacomini Wetlands Restoration Plan

I have been a resident of the Point Reyes area for over 32 years.
In that time I have watched this area become more and more populated
And built up.
I am in support of what is best for the bay; the preservation and restoration of the fragile ecological balance of the bay and the surrounding areas.

I strongly urge the park to support **ALTERNATIVE D** . We have to preserve this unique area. There are so few "wild" areas left on this planet.

The public has more than enough access to this 75,000 acre park.
Any more access would be adding to the erosion of the very quality that attracts people to this area.

Thank You for listening,

Ellen Lesli

It's here! Your new message!
Get new email alerts with the free Yahoo! Toolbar.

"Ken Levin"
<klevin@horizoncable.com>

02/13/2007 08:35 AM
PST

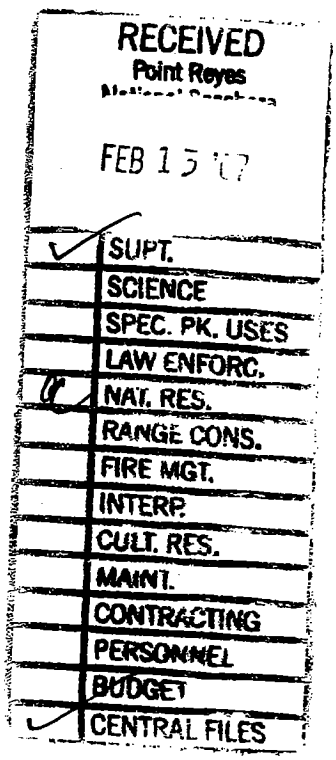
To: <park_planning@nps.gov>
cc:
Subject: (Giacomini) Tomales Bay Wetalnds Restoration

This letter is in strong support of **Alternative D** . **Alternative D** is the plan most likely to restore the hydrologic and ecologic function of Tomales Bay and return the reclaimed cow pasture to a beautiful marsh.

The fewer "visitor serving" facilities or amendments included in the plan, the better. There are already enough in the area to provide access and views. In this particular situation nature must come first; it is important to give highest priority to restoration of the environment.

Particularly, no bridge over Lagunitas Creek. This would be a visual, environmental and financial disaster.

Ken Levin
Point Reyes Station



Diane Levy
<diane@dianelevy.com
>

02/04/2007 06:10 PM
PST

To: park_planning@nps.gov
cc: jon_Jarvis@nps.gov
Subject: Giacomini Wetlands Restoration Plan

Dear Superintendent Neubacher,

I am very concerned about the wetlands restoration plan in Point Reyes. Plan D is the least worrisome of the options presented. Please make this the priority.

The origin of the plan was to restore hydrologic and ecologic function of the bay. Plan D accomplishes this in the most cost effective and ecological manner.

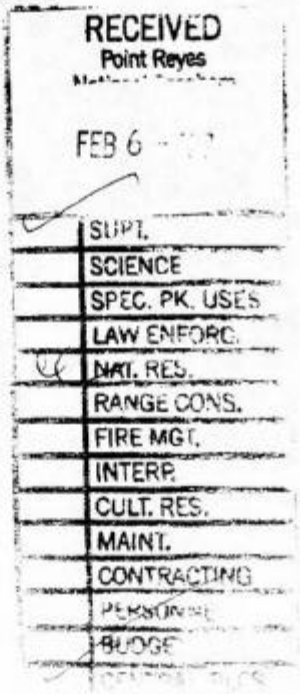
In regards to human access to the area: There are already established alternative sites that provide parking, trails, and observation points at White House Pool, Martinelli Open Space and Olema Marsh. It is unnecessary that further financial output be used to create more access and it does not serve the original plan of restoration. In the long term more human access could create future problems for the ecology of the site and require greater financial burdens for maintenance and upkeep to the area.

Short sighted decision making has created the current overpopulation
of non-native deer species. Curtailing the culling of the herds now presents the park with a public relations nightmare. This is not the time for another decision made for the present, without regard for the future impact. Rather than with the deer, when more intervention would have been better, in this case, less is best!!!

Please use Plan D, perhaps with a bridge across Papermill Creek as a
concession to access, but no more than that. Plan D is the best option for the intended goals of the restoration project.

Thank you,

Diane Levy



John Levy
<johnlevy@cs.stanford.edu>
02/04/2007 04:33 PM
PST

To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: Giacomini Wetlands Restoration Plan comment

Superintendent, Pt. Reyes National Seashore:

Regarding the proposals for restoration of the Giacomini Wetlands, I would like to note my strong preference for Alternative D.

The restoration of the wetlands is an important step in furthering the ecosystem represented by the National Seashore. In Alternative C, the inclusion of a bridge over Lagunitas Creek and the improvement of trails to ADA compliance level would add to the intensity of public use in the immediate area of the wetlands, threatening the effectiveness of the restoration in the most popular areas.

While we in the community surrounding the Point Reyes National Seashore welcome the seasonal arrival of millions of visitors to the park and to our community, I believe we must anticipate a steady increase in the pressure of visitors to the area and therefore minimize the number of access points in this very sensitive area. As a result, Alternative D is the best choice.

Thank you for you attention.

Sincerely yours,

--John V. Levy, Ph.D.
Inverness Park, CA

John Levy
415 663-0611

P.O. Box 1012
Inverness, CA 94937

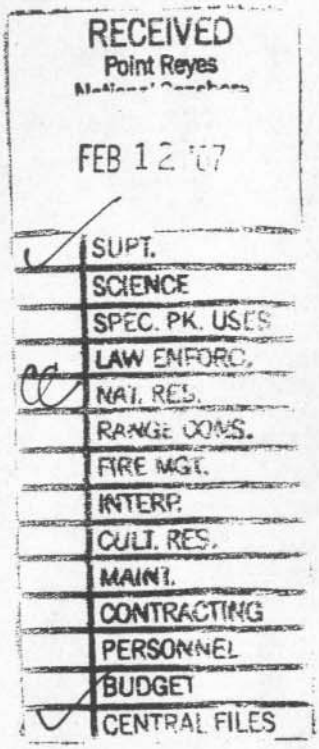
RECEIVED
Point Reyes
FEB 6 - '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

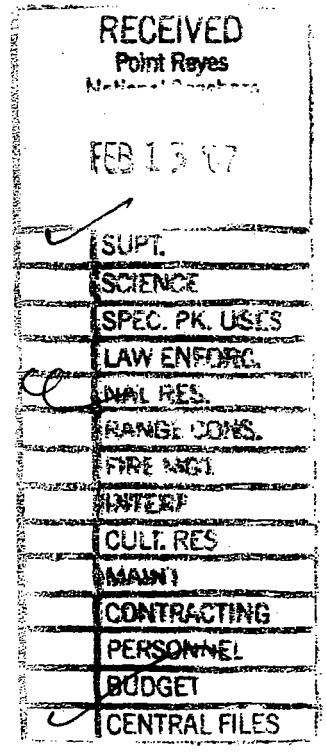
Barry Linder
<barrylinda@earthlink.net>

02/09/2007 07:16 PM
PST

To: pore_planning@nps.gov
cc:
Subject: Tomales Bay restoration

Lets have plan D. Lets have bridge over creek so we can use the path to PRS. Thanks Linda Linder





Michael Linvill
1317 Lincoln Avenue, #15
San Rafael, CA 94901
(415) 453-4093
mikelinvill@yahoo.com

February 11,2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Regarding: Giacomini Wetlands Restoration Project

Dear Mr. Neubacher:

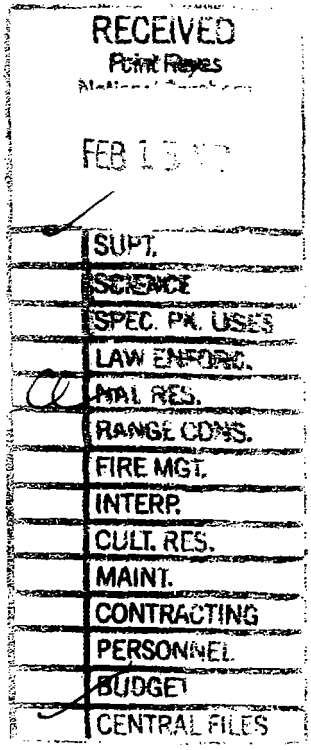
I first moved to Marin County from San Francisco when I was 10 years old in 1971. My parents came here in large part because of Marin's extraordinary scenery and unique balance of nature and people. I believe that it is a priority to not only preserve what is left of Marin's natural heritage, but also to restore as much of it as possible.

Thank you for your support of wetlands restoration at the south end of Tomales Bay. The restoration will help to sustain numerous threatened wildlife species, particularly Coho salmon which come to spawn in the Olema and Lagunitas creeks. However, I am concerned about the park's support of Alternative C, which will allow too much public access at the expense of wildlife.

Please reconsider your position and support Alternative D, the environmentally preferred alternative, because it provides for the most extensive restoration of the wetlands and will benefit wildlife the most. In addition, please provide for a bridge over Lagunitas Creek and the trail connection between Green Bridge and White House Pool. Thank you.

Sincerely,

Michael Linvill



Ruth Linvill
100 Thorndale, #106
San Rafael, CA 94903
ruthlinvill@aol.com

February 10,2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Dear Mr. Neubacher:

I am writing to you because I support Alternative D as the plan that should be implemented in restoring the wetlands at Giacomini. Although the plan supported by your office is a good one, it doesn't go far enough in reducing human intrusion on the wetlands. I also support a bridge over Lagunitas creek and the trail connection between Green Bridge and Whitehouse Pool. Thank you for hearing my comments.

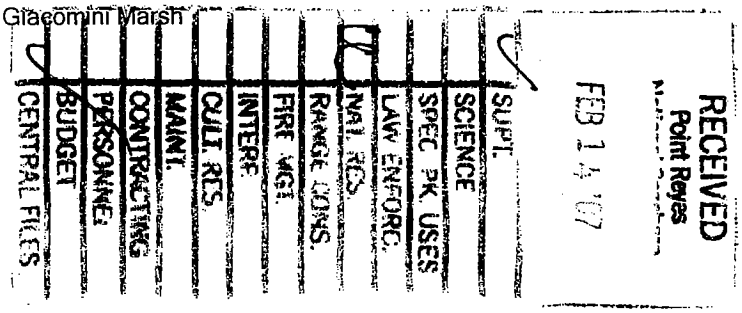
Sincerely,

Ruth Linvill

Ruth Linvill

Dewey Livingston
<dlive@svn.net>
02/14/2007 10:51 AM
PST

To: Park_Planning@nps.gov
cc:
Subject: Giacomini Marsh



February 14, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

Re: Comments on the Draft EIR, Giacomini Wetlands Restoration

Dear Don:

I appreciate the chance to comment on the EIR, as this is a very important and historic undertaking. For the most part, the document appears to be very good and thorough.

I support a combination of Alternatives B through D, with the following comments:

1. The proposed bridge would sit like a sore thumb in a critical section of the restoration project with its over-engineered abutments and approaches; the needed berm/levee to support a multi-use trail on either side would be a hindrance to proper restoration; and it would be too costly. As an alternative, we would propose a seasonal bridge that could be lifted into place with a crane in the spring and removed in the late fall, connecting a small, seasonal trail. This should be less costly, but I realize it probably wouldn't pass muster with all the regulations of this over-regulated society.

2. The whole project is impeded by the existence of the Levee Road: it is like leaving a piece of rotten meat in your newly cleaned refrigerator. Yes, another impossibility: replace most of the road with an elevated roadway. At the least, provide more than one new break in the road, possibly three to five; otherwise the project, especially involving Olema Marsh, will be compromised. Why such a big compromise when so much money and energy is being poured into this project?

3. A small trail along the east side railroad grade should be included: not a developed, wide, multi-use trail, but limited access (no bikes, pets, etc.). At the least, there should be no barriers of access to the area, as we doubt that individuals using a minor, unmarked and unpublicized trail have the potential to cause harm.

4. I am concerned about the fate of the original Inverness Park Store building. I acknowledge that it is in terrible condition and may not meet the criteria for the National Register, but it is a unique old structure being the only surviving historic commercial building in IP. I suggest that its shell be rehabbed into a small, unmanned visitor center/museum that could be opened by a passing ranger in the morning and closed up in the evening (seeing how dozens of park staff pass the place daily, and

many of them stop at Perry's!).

5. I am also concerned about creating a trailhead in Point Reyes Station without adequate parking.

As an aside, did you know that about 100 years ago, there was an elevated boardwalk along the creek at the road bend at the bottom of Balboa Road? A structural precedent for a trail to IP!

Thank you for this opportunity to comment, and good luck.

Dewey Livingston
P.O. Box 296
Inverness, CA 94937
415-669-7706
dlive@svn.net

"Jack Long" <jack@creeksidebirds.com>
02/14/2007 05:38 PM PST

To: <park_planning@nps.gov>
cc:
Subject: You have received photos from Adobe Photoshop Album

LETS STAY WITH ALTERNATIVE D WE DO NOT NEED MORE CARS OR PARKED CARS ON THE LEVEE ROAD I WOULD FEEL SAFER ON A FREEWAY THAN WALKING ON THE LEVEE ROAD SIR FRANCIS DRAKE BLVD. DOCTORS TELL US TO WALK MORE , IN THIS CASE WALKING COULD KILL YOU . THIS PICTURE TELLS IT ALL 35 YEARS LIVING HERE I HAVE SEEN IT ALL I F ALTERNATIVE D IS THE BEST CHOICE THEN STAY WITH IT JACK LONG

Download Photoshop(R) Album 2.0 Starter Edition free to create your own photo slideshows!

http://www.adobe.com/getstarteredition scan001001_edited.jpg

RECEIVED
Point Reyes
FEB 15 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

"John Lopez \(hm ofc\)"
<mecoak@hotmail.com
>

02/12/2007 04:56 PM
PST

To: <park_planning@nps.gov>
cc: <Jon_Jarvis@nps.gov>
Subject: Gacomini wetlands Alternative D w/bridge & change of parking

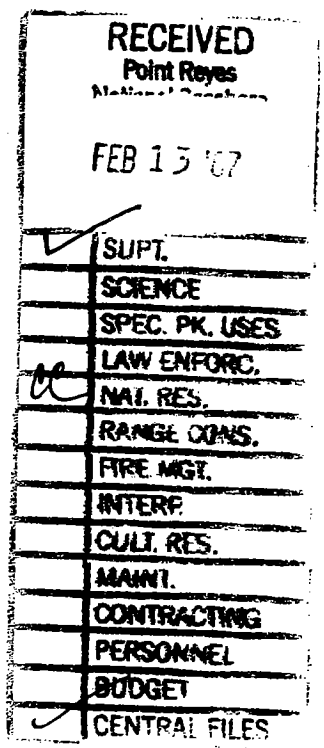
To Planning committee:

With discussions with my family (Three children who use trails) our neighbors and community members there is debate of how best to give input for our National Park. We in the community do understand that the whole nation is paying for our beautiful backyard. I would like to put my vote for the limited access to the new wetlands but with a multiuse trail for pedestrian, equestrians and bicyclist (of course some info for use and right of way). With a bridge put at the point of the old Gacomini seasonal dam. This bridge would produce a continuous link to/from the park and Point Reyes Station and Inverness Park.

So while I would approve Alternative C because of the bridge, **I would like to vote for Alternate D with the addition of bridge. I would also like to suggest changing the parking from near the Green Barn(Red Barn) current housing area to Park owned land in the current Gacomini dairy ranch area.**

Thank you so much for allowing for our input.

John Lopez
11190 Sir Francis Drake (Levee Rd.)
Point Reyes Station
415-663-8801



"Ruth Kantor Lopez"
<Bookworm@svn.net>

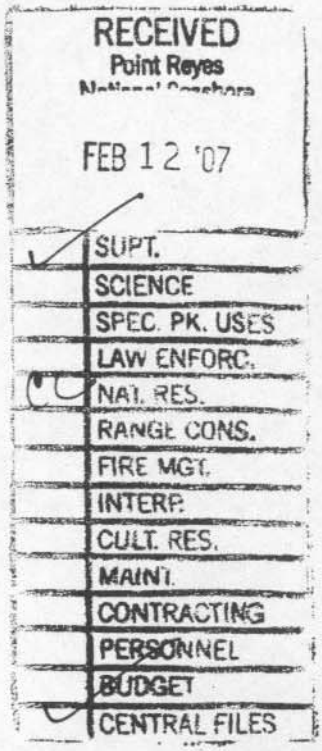
02/12/2007 03:17 AM
PST

To: <park_planning@nps.gov>
cc: <Jon_Jarvis@nps.gov>
Subject: wetlands restoration plans

After reviewing plans C and D for the wetlands restoration at Point Reyes National Seashore, I would like to urge the park to adopt plan D with the addition of the bridge over the creek. The bridge is much needed by the community, but the other access components of plan C I fear will cause undesirable development and related problems.

Thank you for your consideration,

Ruth Kantor Lopez
Levee road resident, Point Reyes Station



Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Alt C

Public Access - connecting all the way to Inverness rather than stopping at Inverness Park, with a shared-use path should be included in the scope when it comes time to work with the County on this project.

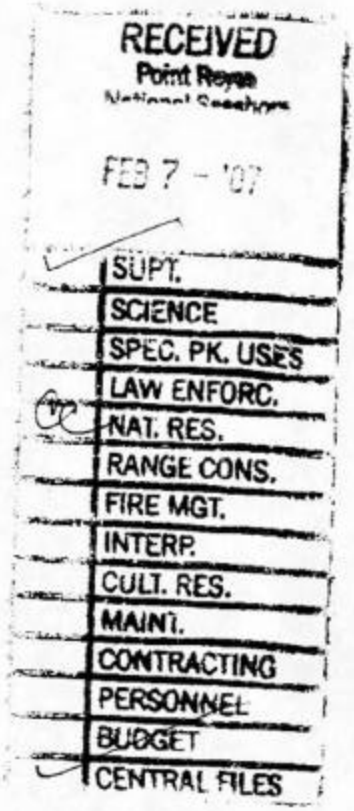
Like. Alt C's public Access,

Good Job [D would be good with C's Access]

LISA LUZZI
PO Box 526 PRS.
lisaluzzi@gmail.com

"Melissa Lyckberg"
<gratitude@saber.net>
02/07/2007 08:24 AM
PST

To: <park_planning@nps.gov>
cc:
Subject: FW: no on plan C



Hello – I want plan D not plan C.

Bruce Lyckberg
663-1988

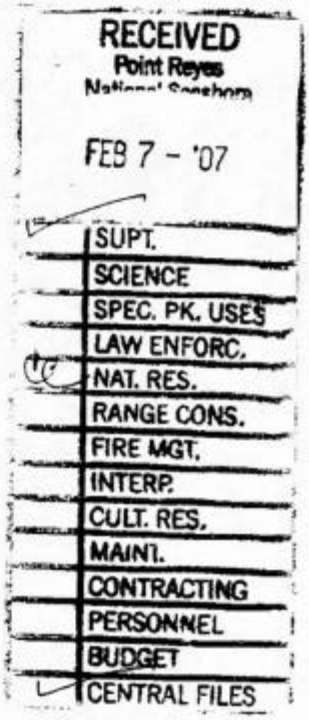
"Melissa Lyckberg"
<gratitude@saber.net>
02/07/2007 08:23 AM
PST

To: <park_planning@nps.gov>
cc:
Subject: support of plan D

I support plan D. I live on Los Reyes Drive, near Mesa Road in Point Reyes Station.

I DO NOT WANT PLAN C!

Melissa Lyckberg
Frank Howard Allen Realtors
511 Sir Francis Drake Boulevard
Greenbrae, CA 94904
415-925-3262 direct
415-309-5799 mobile
www.MoveToMarin.com



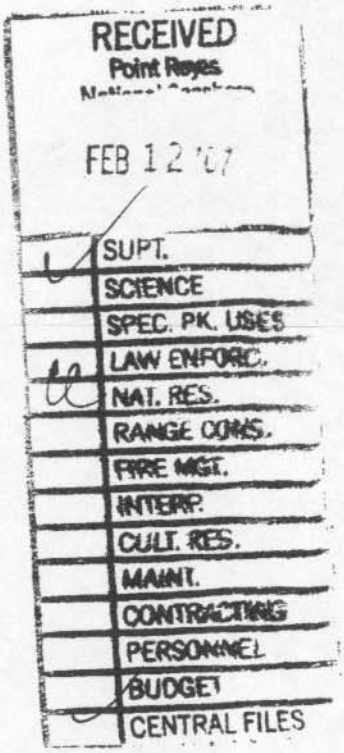
"Jay MacMahon"
<jmacmahon@freitaslaw.com>
02/12/2007 11:10 AM
PST

To: <park_planning@nps.gov>
cc: <jon_Jarvis@nps.gov>
Subject: ALTERNATIVE D -- GIACOMINI WETLANDS RESTORATION PLAN

I own the improved residential property at 11150 and 11160 Sir Francis Drake Blvd. (Levee Road) since 1974, as well as 21+ acres of unimproved property at the end of Fox Drive in the Bear Valley Property Owners subdivision since 1960.

I support ALTERNATIVE D over ALTERNATIVE C

Sincerely, Jay & Gloria MacMahon.



Melanie Matheson
1317 Lincoln Avenue, #4
San Rafael, CA 94901

February 12, 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes, CA 94956

Dear Mr. Neubacher:

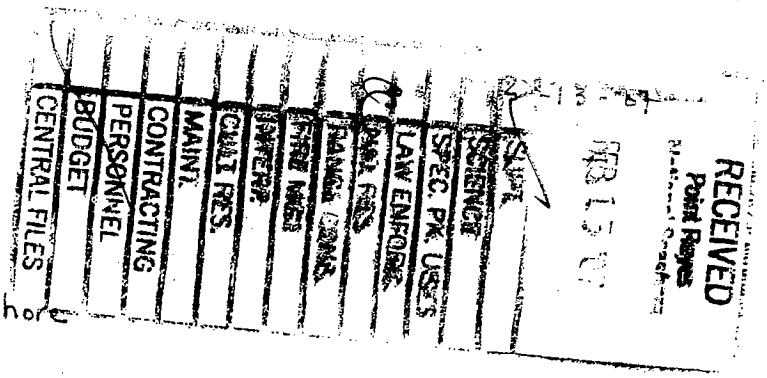
I support full restoration of the wetlands at Tomales Bay, specifically those at the southern end of the bay because of their importance as a home for wildlife. Salmon, in particular, depend on the creeks in the area as a place to spawn.

I have lived in Marin since childhood and am proud of Marin's commitment to preserving the natural beauty and wildlife over the years. To that end, I think that the plan your service has decided to utilize to restore the wetlands, although constructive in helping reverse the damage to the wetlands, will not be sufficient. I believe that **Alternative D is better** because it will be the most effective in reducing human impacts on the fragile wetlands. As part of a comprehensive plan to save the wetlands, I also support a bridge over Lagunitas Creek and the trail connection between Green Bridge and White House Pool.

Thank you for your continued watch over Tomales Bay, and please bolster your effort by adopting Alternative D to restore the Giacomini Wetlands.

Sincerely,

Melanie Matheson



Don Neubacher
Superintendent
Pt. Reyes National Seashore
Pt. Reyes CA 94956

Re: Alternative D - Giacomini Wetlands Restoration Plan

Dear Mr. Neubacher,

As a resident of West Marin and a native plant habitat restorer, I respectfully request that you decide to implement Alternate D <u>without a bridge</u>.

Working on the levee road for the past several years has made it obvious to me how much the creatures that try to exist in and around the creek are limited and jeopardized.

If a bike lane is needed a better choice would be on the south side of the levee road.

Thank you for your consideration.

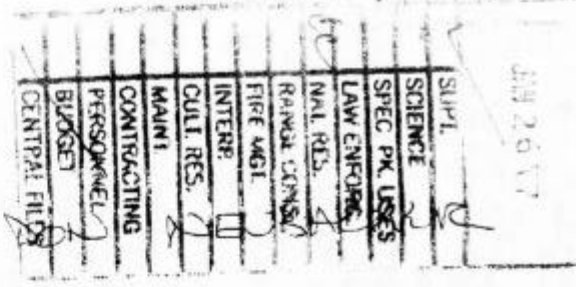
The wetlands and the bay need <u>maximum restoration</u>.

Sincerely,

Kathleen Mayer
P.O. Box 1091
Inverness CA 94937

Cc: Jon Jarvis, Regional Director, National Park Service

Lorraine Nasa



DATE: 1-26-07

TO: SUPERINTENDENT

FROM: MICHAEL MCENEANY 669-1868

SUBJECT: PERIMETER TRAILS ON RESTORED M
(ANOTHER ALTERNATIVE)

COMMENTS:
PERHAPS PERIMETER TRAILS AROUND TH
RESTORED MARSH COULD BE CONSTRUCTED
ALONG ~~USING~~ THE SR FRANCIS DRAKE BLVD. RIGHT-O
WAY FROM WHITE HOUSE POND TO IN
USING CLEAN, COMPACTABLE NATIVE F
COLLECTED FROM RESTORATION EXCAVATIO
PROJECTS.

THOUSANDS OF TRUCK TRIPS OUT TO PI
POINT COULD BE ELIMINATED AND A RE
TRAIL CREATED IF THE EXCAVATED MATER
WERE UTILIZED IN THIS FASHION.

Trish McEneany
<mceneany@svn.net>
02/13/2007 10:29 AM
PST

To: Park_planning@nps.gov
cc: lcrosse@co.marin.ca.us
Subject: Giacommini Marsh Restoration @ Point Reyes National Seashore

Regarding the creation of a bicycle and pedestrian path from Inverness to Point Reyes Station:
In two previous comments submitted to the Superintendent, I failed to mention that this subject has been discussed many times in the County of Marin planning process. Specifically, it is mentioned in the Marin County Bicycle and Pedestrian Master Plan, prepared for the Marin County Congestion Management Agency in June of 2000.
Given the County's interest in developing such a pathway along the Sir Francis Drake Boulevard right of way, one might see this as a good time to explore the possibility of a cooperative effort to achieve this end.
Using the spoils from excavation activities in the marsh to widen the bay side shoulder of the roadway would save possibly thousands of truck trips over Ottinger's Hill, reducing costs and environmental disruption attendant with their disposal at Pierce Point.
Michael McEneany
Inverness,CA
415-669-1868

RECEIVED
Point Reyes
National Seashore
FEB 15 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Michael McEneany
P.O. Box 892
Inverness, CA 94937
415-669-1868

Point Reyes National Seashore
Giacomini Wetland Restoration Project Meeting
January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Consider Removal of overhead utility lines along Sir Francis Drake Blvd. from White House Pool to Inverness thereby making the shore-side shoulder of the road available for an ~~path~~ informal or more developed path. P.U.C. funds may be available to help fund this under SECTION 20 A PER Leeza Gross @ Sup Kinsey's OFFICE

- Public Safety Enhancement
- Viewshed Enhancement
- Other ongoing projects.

FACTORS FAVORING EXPENDITURE ~~FACTOR EXPENDITURE~~
OF PUC FUNDS

INVITED / INV RESIDENT
IPUD BOARD MEMB

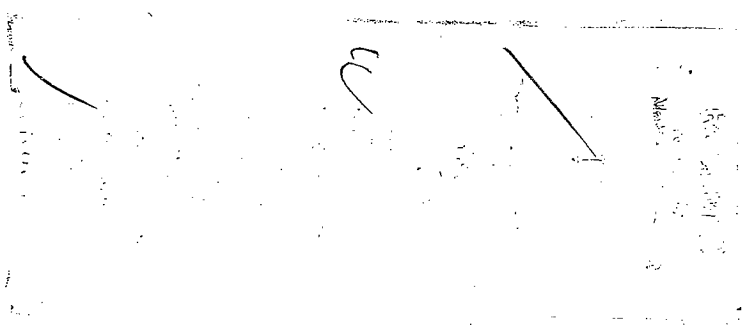
HISTORY OF BEING CUT
OFF & LOSING ELEC SERV.

Point Reyes National Seashore
Giacomini Wetland Restoration Project Meeting
January 25, 2007

1) Is restoration of Olema Marsh contingent upon excavating the west pasture? What's the original height of the pasture & is all that expensive excavation necessary? I'd like to see the Marsh restoration (C, or D)

2) We dog walkers would like to keep the Wildlife Conservation Board areas as they are: off leash, at least in practice. The nearest other places are Bolinas Ridge and Millerton, several miles away. Also, the pathway to Inverness Park should allow dogs.

Philip McKee / Inverness Park

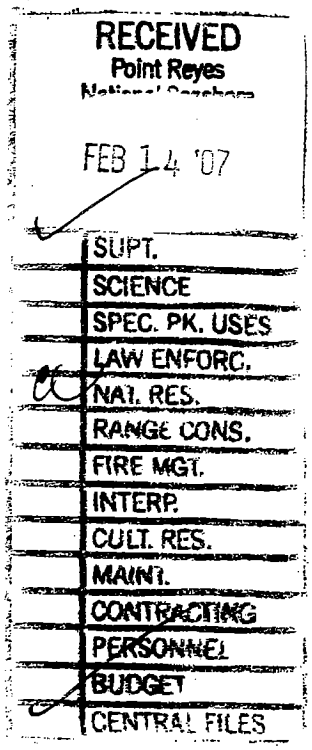


kaymcmahon@svn.net
02/13/2007 11:09 PM
EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetland Restoration Project

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

Dear Superintendent Don Neubacher - I would like to thank you, and all of the other Park Service employees, consultants and volunteers, for the many years of hard work and dedicated effort to move forward the Giacomini Wetland Restoration Project. My support is for Alternative D, with a little modification as is possible. Sincerely Yours, Kay McMahon 81 Dover Road (Box 201) Inverness CA 94937

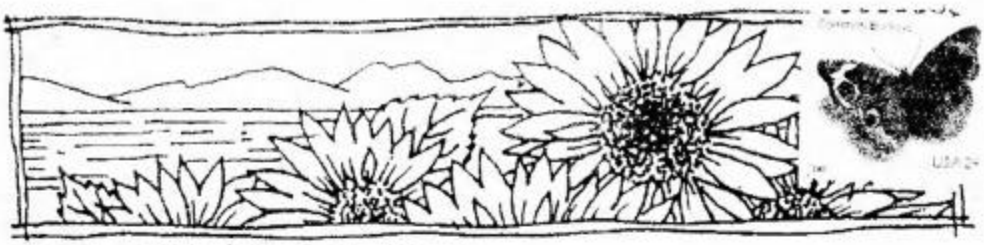


2/5/07

Dear Don,

I urge the park to support Alternative D with the addition of a bridge across Lagunitas Creek from the southern path from Pt Reyes.

Thankyou — Nell Melcher



NELL MELCHER STUDIO
P.O. Box 153 * Point Reyes, CA 94956
415-663-1815 * Phone & Fax
www.nellmelcher.com

Don Neubacher
Attn: Giacomini Wetlands
Pt. Reyes Nat'l Seashore
Point Reyes, CA 94956

"Jerry Meral"
<jmeral@horizoncable.com>
02/10/2007 08:05 AM
PST

To: <pore_planning@nps.gov>
cc:
Subject: Papermill Creek wetlands restoration

February 10, 2007

Superintendent Don Neubacher
Point Reyes National Seashore

Dear Don:

I support the selection of Alternative D, the Environmentally Preferred alternative that provides for the most extensive restoration of the Tomales Bay wetlands. There are three reasons:

1) With sea level rise, it is important to maximize wetlands productivity, so that the vegetation can "keep up" with the rising sea level.

2) Coastal wetlands are very scarce in California, so it is important to maximize their restoration.

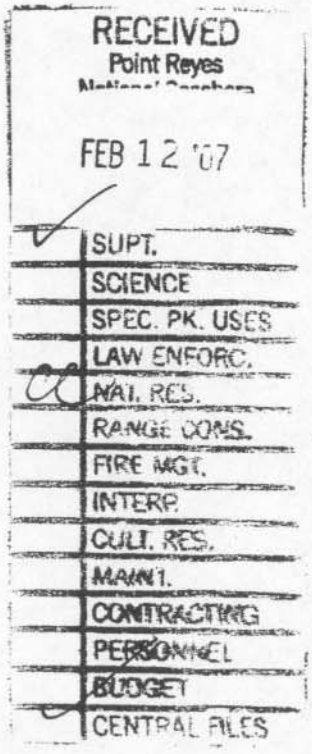
3) The tourism economy of our area will benefit from restoration, since bird watching is a major activity for tourists here.

I support the position of the Environmental Action Committee of West Marin regarding the bridge over Lagunitas Creek and trail connection between the Green Bridge and the White House Pool.

Best regards,

Jerry Meral

Gerald H. Meral, Ph.D.
PO 1103
Inverness, CA 94937
phone/fax 415-669-9883
mobile: 415-717-8412
jmeral@horizoncable.com



"Connie Mery"
<cmery@horizoncable.com>

02/08/2007 10:47 PM
PST

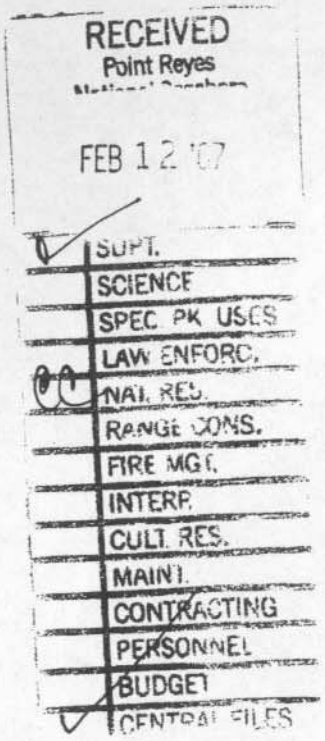
To: <pore_planning@nps.gov>
cc:
Subject: marsh restoration

Dear Don,

I think it would be best to have the maximum wildlife protected.
Maybe that expensive bridge is unecessary.

thanks

connie mery



Michael Mery

February 11, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Comments on the Draft EIR: Giacomini Wetlands Restoration.
Dear Don:

You and the Seashore staff have done a first rate evaluation of the proposed wetland restoration, the excellence being reflected by the depth of the analyses in the draft EIS. I look forward with anticipation to watching the restoration proceed with the fascinating changes in vegetation and the various wild species that will benefit from the marsh.

I urge the Park to implement Alternative D, the "preferred environmental alternative." In my view, ecological restoration is primary and all other interests are secondary because of the rarity of wetlands, in general, and the health of the bay and our ecosystem, in particular. There are many special status species in the restoration area and that, too, calls for the best possible restoration effort.

I urge the following:

1. Implement Alternative D.
2. Eliminate the bridge over Lagunitas Creek because of excessive costs and budget limitations. Those monies would be more wisely spent on improving the connectivity between the Olema and Giacomini marshes.
3. Greater emphasis on the four major feeder streams: Lagunitas, Bear Valley, Olema and Tomasini Creeks. Limit public access to the riparian areas including the transitional zones allowing for the greatest possible vegetation and associated habitat improvement.
4. Maximize tidal access for all the drainages as per the description in Alternative D.
5. Eliminate the access point parking area at the farm worker housing on Mesa Road. This site will likely pose management problems for the Seashore as it will become a destination. The access in town near the ranch housing is much more desirable since visitors and residents can easily walk from town unlike the farm worker housing site where there is very poor pedestrian access from Mesa Road.
6. The Ag zoned property on the East side of the marsh should be in public ownership leading to the removal of all barns, etc.

The Preferred Alternative has many of the aspects of Alternative D, but in a weaker form. Because of the importance of the marsh and the unusual nature of this opportunity, doing the most complete restoration possible should be the goal.

P.O. Box 729, 64 Knob Hill Road, Pt. Reyes Station, CA 94956
Voice: 415/663-1623 Fax: 415/663-1623 Email: mmery@horizoncable.com

My heartfelt thanks to you and your staff for your dedication to the ecosystem we share. The public/private partnership in which so many participate is possible because of the openness and professionalism of Park Service staff. I and many others look forward to the changes as the marsh evolves, as we watch the creatures and plant life with which we share this ecosystem become reestablished in their, and our, recovering wetland.

Thanks for the opportunity to comment.

Respectfully,

Michael Mery

P.O. Box 729 Pt. Reyes Station, CA 94956
Voice: 415/663-1623 Fax: 415/663-5403 Email: mmery@horizoncable.com

Michael Mery

February 12, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Additional Comments on the Draft EIR: Giacomini Wetlands Restoration.
Dear Don:

To my prior comments I would like to add the following:

1. Please negotiate a management agreement with the California State Lands Commission to take on the responsibility for their 500+ acre parcel so as to integrate that management with the marsh restoration.
2. To facilitate foot and bicycle traffic from PRS to Inverness Park, please consider widening the SFD Blvd. from the Green Bridge west. Widen the southern portion so as to allow a bicycle and foot lane on the northern side of the road to the point where the path along the creek begins.
3. I add my support to the PRS Village Association letter, enclosed.

Thanks for the opportunity to comment.

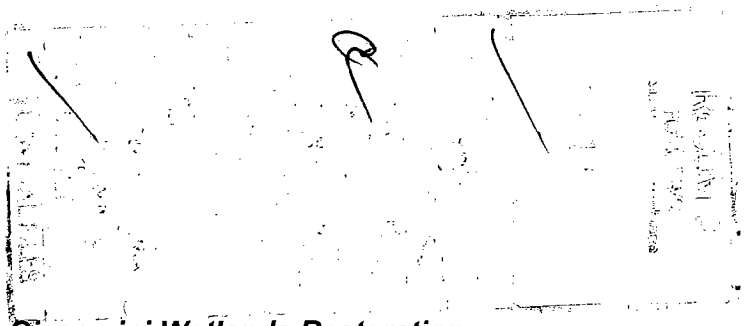
Respectfully,

Michael Mery

P.O. Box 729, 64 Knob Hill Road, Pt. Reyes Station, CA 94956
Voice: 415/663-1623 Fax: 415/663-1623 Email: mmery@horizoncable.com

BRIDGER M. MITCHELL

290 Camino del Mar
Inverness, CA



February 14, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

re: Comments on the Draft EIR: Giacomini Wetlands Restoration

Dear Don,

I commend the Park Service and your team for the high-quality Draft EIR and for undertaking the public consultation process.

I have not had the opportunity to read the entire draft report, but have selectively reviewed the executive summary and descriptions of Alternatives C and D. I trust that the final decision need not be constrained to the precise alternatives contained in the report, but can be further developed and fine-tuned to reflect comments from this consultation. I have read the thoughtful and constructive comments of the Point Reyes Station Village Association and the Sierra Club and find them well considered.

In preparing the report staff has clearly considered a great many factors, and has been attentive to community comment. This is particularly evident in the components for public access included in Alternative C.

Nevertheless, I believe adequate access can be achieved at lower cost and with greater environmental benefits by moving toward a restoration plan constructed around Alternative D. **I support Alternative D.**

In particular, the perimeter trail along the southern boundary of the Giacomini Wetlands can be better achieved, at lower cost, by not installing a very costly pedestrian bridge. Instead, alternative D can be improved by widening the shoulders of the Levee Road to safely accommodate pedestrian and bicycle travel, improving connectivity between Point Reyes Station and Inverness.

Restoration of a single, interconnected wetlands area encompassing both the Giacomini fields and Olema Marsh is, to my mind, the component of the project that is least advanced. Clearly, reconception of the Levee Road as a causeway will involve other agencies. Nevertheless, funds not expended on the proposed bridge should be redirected to restoring the hydraulic connectivity of the Wetlands with the Olema Marsh.

I encourage you to continue to envision a restoration effort that transcends just the NPS and to work for coordinated and cooperative solutions with the County, ACR, and other affected organizations. The project will be more successful as a result of conceiving the environment at the southern end of Tomales Bay holistically.

Sincerely yours,

B. Mitchell

"Jim Monson"
<jamesmon@svn.net>
02/09/2007 03:45 PM
PST

To: <pore_planning@nps.gov>
cc: "Julie" <juliemon@svn.net>
Subject: Attn: Giacomini Wetlands Restoration Project

Superintendent Neubacher and staff,

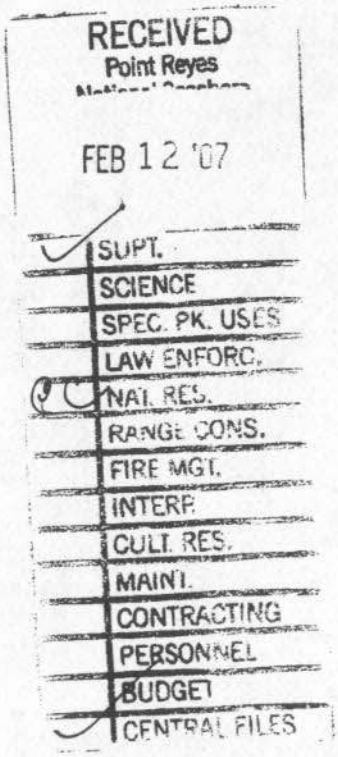
Thanks so much for all of the work that you have done in planning to make the wetlands restoration project serve community and environmental needs. I particularly appreciate the public meeting that you held at the Red Barn a few weeks ago. The presentation was very clear, and you did everything possible to give everyone a chance to hear and be heard.

Julie and I would like to indicate our preference among the various alternatives presented. We favor the EAC proposal presented at the meeting - i.e., alternative D, modified to include a bridge across the creek that would enable trail access from White House Pool to Point Reyes Station. We feel that this plan would give maximum environmental protection, while giving people access to the wetlands and providing a safe pedestrian walkway all the way to Point Reyes Station from White House Pool.

We look forward to the next steps in the restoration of the wetlands.

All the best,

Jim Monson
40 Fox Drive
Point Reyes Station



RECEIVED
Point Reyes
National Seashore
FEB 12 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
GENERAL

SharonMooney
<smooney@svn.net>
02/11/2007 03:51 PM
PST

To: Park_Planning@nps.gov
cc:
Subject: Giacomini Marsh

I am in support of the proposal below suggested by Michael Mery:

uperintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

RE: Comments on the Draft EIR: Giacomini Wetlands Restoration.
Dear Don:

You and the Seashore staff have done a first rate evaluation of the proposed wetlands restoration, the excellence being reflected by the depth of the analyses in the draft EIS. I look forward with anticipation to watching the restoration proceed with the fascinating changes in vegetation and the various wild species that will benefit from the marsh.

I urge the Park to implement Alternative D, the "preferred environmental alternative." In my view, ecological restoration is primary and all other interests are secondary because of the rarity of wetlands, in general, and the health of the bay and our ecosystem, in particular. There are many special status species in the restoration area and that, too, calls for the best possible restoration effort.

I urge the following:

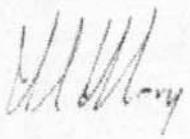
1. Implement Alternative D.
2. Eliminate the bridge over Lagunitas Creek because of excessive costs and budget limitations. Those monies would be more wisely spent on improving the connectivity between the Olema and Giacomini marshes.
3. Greater emphasis on the four major feeder streams: Lagunitas, Bear Valley, Olema and Tomasini Creeks. Limit public access to the riparian areas including the transitional zones allowing for the greatest possible vegetation and associated habitat improvement.
4. Maximize tidal access for all the drainages as per the description in Alternative D.
5. Eliminate the access point parking area at the farm worker housing on Mesa Road. This site will likely pose management problems for the Seashore as it will become a destination. The access in town near the ranch housing is much more desirable since visitors and residents can easily walk from town unlike the farm worker housing site where there is very poor pedestrian access from Mesa Road.
6. The Ag zoned property on the East side of the marsh should be in public ownership leading to the removal of all barns, etc.

The Preferred Alternative has many of the aspects of Alternative D, but in a weaker form. Because of the importance of the marsh and the unusual nature of this opportunity, doing the most complete restoration possible should be the goal.

My heartfelt thanks to you and your staff for your dedication to the ecosystem we share. The public/private partnership in which so many participate is possible because of the openness and professionalism of Park Service staff. I and many others look forward to the changes as the marsh evolves, as we watch the creatures and plant life with which we share this ecosystem become reestablished in their, and our, recovering wetland.

Thanks for the opportunity to comment.

Respectfully,



Michael Mery

TO THE
SUPERINTENDANT
PT REYES NATIONAL
SEASHORE

I prefer plan "D"
with the inclusion
of a bridge and
pathway for
the
Giacomini wetland
restoration project
I've lived in
Pt Reyes since
1973.

Charlie
Morgan

Ann Nelson
01/30/2007 09:38 AM PST

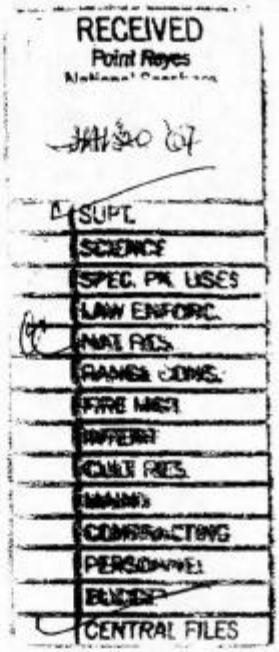
To: file
cc:
Subject: Fw: Attn: Giacomini Wetlands Restoration Project

M M <marinspin@yahoo.com>
01/29/2007 05:46 PM PST

To: pore_planning@nps.gov
cc:
Subject: Fwd: Attn: Giacomini Wetlands Restoration Project

forwarded bt--- M M <marinspin@yahoo.com> wrote:

> Date: Sun, 28 Jan 2007 15:07:42 -0800 (PST)
> From: M M <marinspin@yahoo.com>
> Subject: Attn: Giacomini Wetlands Restoration
> Project
> To: parkplanning@nps.gov
>
>
> Jan. 28, 2007
>
>
> To:
>
> Don Neubacher, Superintendent
> Point Reyes National Seashore
> Point Reyes, CA 94956
> Attn: Giacomini Wetlands Restoration Project
>
> I would like the park to go with plan D because of
> the
> following reasons:
>
> D will provide more habitat for more
> wetland-dependent
> species, more natural hydrological function, and
> more
> extensive restoration of riparian habitats in the
> Lagunitas Creek delta and at the mouth of Tomasini
> Creek. Ultimately, these factors will contribute to
> a
> healthier Tomales bay and greater biodiversity along
> its shores.
>
> Thank you,
>
> Marjorie Morgenstern - Long time Marin County
> Resident
>
>
>
>
>
>



> Yahoo! Music Unlimited

"Marble Marble"
<marble74@hotmail.com>

02/14/2007 12:04 AM
GMT

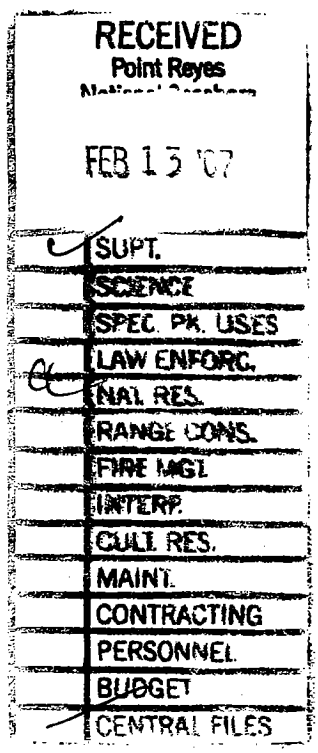
To: park_planning@nps.gov
cc: jon_jarvis@nps.gov
Subject: Giacomini Wetlands Restoration: In Favor of ALTERNATIVE D

To allConcerned, I am STRONGLY in favor of measure D as written (without the modification of the bridge). The opportunity to restore these wetlands and grasslands should be pursued whole-heartedly and recognized as the special and necessary contribution this would make to the Tomales Bay ecosystem. Any paths (particularly those including dogs, horses and bicycles) are antithetical to this purpose as they would disrupt and impinge on returning birds and other animals and plants. Who would supervise the functioning of the proposed path, who would pick up the dog and horse feces (which contain contaminants and seeds from invasive plant species) left behind; who would insure that the dogs were not on leash and not routing birds, etc?; who would pick up the garbage left by humans?

In short, I feel the best policy is that which would contribute to the most efficient healthful functioning of Tomales Bay: ALTERNATIVE D.

Thank you for the opportunity to comment. Sincerely, Mary Moser

Search for grocery stores. Find gratitude. Turn a simple search into something more.



terry nordbye
<terry@visionroad.us>
01/31/2007 10:29 PM
PST

To: park_planning@nps.gov
cc: on_jarvis@nps.gov
Subject:

Giacomini Restoration

To the Editor of the Point Reyes Light From Terry Nordbye- Inverness

The proposed plans for the Giacomini wetlands include possible -bike, horse, and foot trails, a very big bridge, a boardwalk, parking spaces and more.

The bike path proponents say that bike trails will get people out of their cars I agree but that is only after they drove the sixty miles to get to the path The trail would be dirt and those skinny tire bikes will not be on the trail People do not bicycle out here on dirt bikes from Fairfax or Fairfield they carry them on their cars and SUV's

The proposed board- walk would go through the old railroad right of way Most people have probably never foraged through this soggy over grown riparian area because since the trains stopped it has grown back to thick and rich and hidden habitat for many a critters Bringing in structures boardwalks and people would be an irreversible disruption to wildlife, a visual insult the human eye and provide the park with an endless and expensive maintenance project

The bridge, according to Don Neaubacher, would cost around $800,000- big and strong enough to withstand the powers of flooding and earthquake. Now even in Gov't dollars, $800.000 is a lot of bridge to look at. And then of course there is $ maintenance.

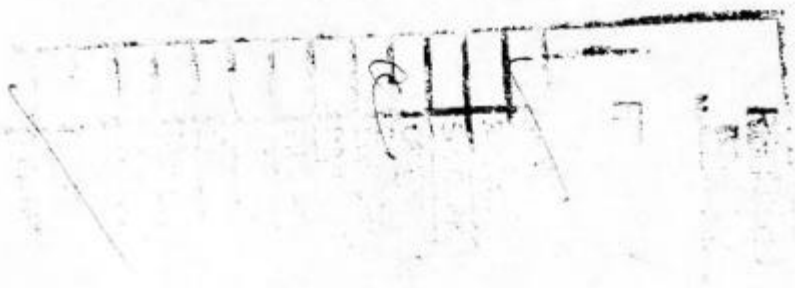
If you build it, they will come.
Be aware that "these charming wildlife trails" will likely end up on Bay Area Back Roads and in Sunset Magazine and will attract many more visitors and their cars to our already overcrowded town

Globally, plant and animal species are losing ground, dying off and becoming extinct The main reason for loss of species is loss of habitat. The main reason for loss of habitat is that humans always want a small piece of whatever i left. In the Giacomini wetland restoration- what is the right balance between pure restoration and our human "need" for access? . The more trails, bikes, horses, brigdes, construction, the less habitat, peace and ground for wildlife. All our demands are met at a cost to wildlife.

This restored wetland will be a thing of beauty, a gift for the wild things, and a centerpiece for Point Reyes Station. Does that not provide enough for our human needs? Can't untouched beauty satisfy our human needs? Could we accept that we don't have to do something to have something, to use something just because it is there?

Beauty does not have to be used: our lives and our soul can be enriched just by knowing it is there

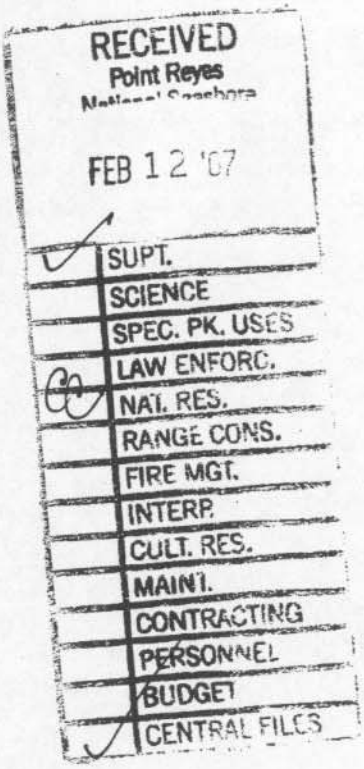
Terry Nordbye



terry nordbye
<terry@visionroad.us>
02/11/2007 07:44 PM
PST

To: pore_planning@nps.gov
cc:
Subject: wetlands

Please leave the wetlands to the wildlife. We (humans) have enough recreational things and toys and trails. Please keep people,dogs, bikes, strollers, picnicers. etc out of the wetlands, that would include bridges, paths and boardwalks. I am sure I don't have to remind you how much habitat has been irreversibly already taken. Your restoration project is a great and commendable endeavor, please keep it as "pure" as possible.
Sincerely, Terry Nordbye- Inverness
PS I ride a bicycle, I spend a lot of days and time walking the trails of the park in my 30 plus years in Inverness.



February 13, 2007

NATIONAL PARK SERVICE
POINT REYES, CA 94956-9799
RECEIVED
FEB 20 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, Ca. 94956

RE: comments on the Draft EIS: Giacomini Wetlands Restoration.

Dear Mr. Neubacher,

Having been a resident of Inverness for many years, I have been extremely pleased with the proposed wetland restoration. It will be exciting to return to Point Reyes and see the changes in vegetation and various wild species that will benefit from the marsh.

I urge the Park to implement Alternative D, the "preferred environmental alternative." Ecological restoration is primary and all other interests are secondary because of the rarity of wetlands, in general, and the health of the bay and the ecosystem, in particular.

Thank you for the opportunity to send you my comments.

Sincerely,

Joan Peterson
5317 Thompsn Creek Road
Applegate, Oregon 97530

Richard Plant
<rlp@svn.net>
02/12/2007 12:33 PM
PST

To: Park_Planning@nps.gov
cc:
Subject: Giacomini Marsh

Dear National Park Officials,

I support alternatives C or D of the Giacomini Marsh restoration project, but with all of the public walk in accesses as indicated in either of both proposals. This is in accord with a national need to provide more exercise opportunities for people while at the same time reducing reliance of fossil fuels for transportation. Additionally, the public has invested heavily in the Park and it is desirable for the public to be able to directly experience, when reasonably possible, that which they have funded. The concept helps to build support for future projects of a similar nature.

Sincerely,

Richard Plant

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

pontacq@horizoncable.com
02/15/2007 03:19 AM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetland Restoration Project

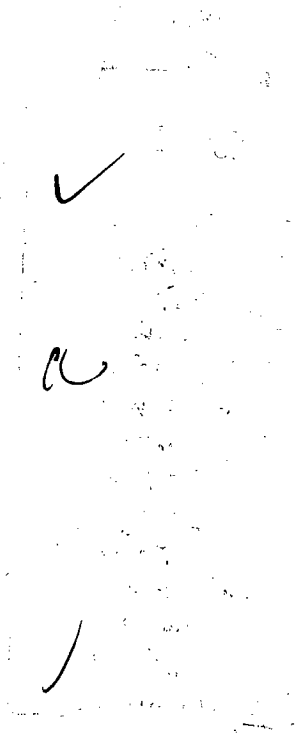
Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

As a resident of Point Reyes Station interested in the viability of the restoration of the Tomales Bay wetlands (also called the Giacomini Wetland Restoration Project), I VOTE FOR OPTION D.

I do NOT support a bridge or multi-use trail on either the east or west side of the wetlands.

I support an unimproved viewing trail for locals all the west side, if possible.

Jeanette Pontacq 415 663 1700 Box 1237/PRS 94956 pontacq@horizoncable.com



Comments on the Giacomini Wetland Restoration Plan:
2/8/07

I am writing to express my concerns about the Preferred Alternative C of the Giacomini Wetland Restoration Project. I live on the Levee Road and currently use the informal footpath already established in the designated area. I often walk from the Green Bridge access, through the Marin County Open Space area and along Lagunitas Creek between the stream and the pasture land.

Over the decades, since it was a natural wetland, this area has gone through many changes. In the past 30 years, we have seen an over-grazed monoculture returned to a diverse forest in the Marin County Open Space plot adjacent to the Green Bridge. We have also seen the streamside area alongside the Giacomini pasture become further degraded as the ranch sent in dozens of truckloads of dirt to repair the breached levees created after last years floods.

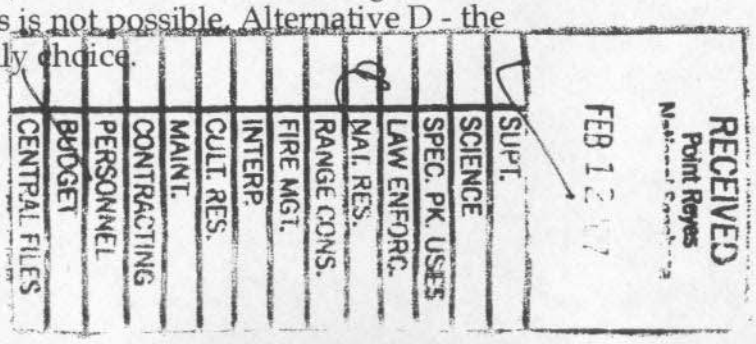
Now there is an opportunity to return much of this land to a viable wetland. Lagunitas Creek needs to be considered a key part of this! At the moment, there are many wild creatures still using the creek. To name a few: black crowned night, great blue and green herons, kingfishers, river otters, and western pond turtles. All these animals are very sensitive to human disturbance. (Those of us, who have an ongoing relationship with the creek, know that they tend to stay away from people, dogs and vehicles and congregate in the more secluded spots.) The trail, as proposed, would potentially bring in way too much use for this very fragile area. Many of us are sure that creating a large boulevard, encouraging multiple uses, will put it way over a sustainable threshold.

"Build it and they will come." We suspect that this trail will not be used to facilitate local mobility. That is not even feasible as there is no plan to be able to get farther north than White House Pool. But instead, it will become a way for horses and bikes to connect up with the Bear Valley trail system. This is a logical use as the current connection through Olema Marsh has to be accessed from the dangerous Levee Road. (This, by the way, remains a real issue but it is not an appropriate responsibility of the Restoration Project.) We also see the inevitability of the Lagunitas trail being used by tourists who want to get out and see the Wetlands on a short, convenient walk from town.

All such use will have a very negative impact on the delicate creek ecosystem. I raised this concern during the last public meeting (1/25/07). The response was that compared to current conditions, which is a leveed ranch, the habitat will be better. I would like to point out that we are not trying to improve on a bad situation. We are trying to restore a wetland and riparian habitat to the way it was pre-ranch!

My recommendation then is that, unless Alternative C can be adapted to include a small footpath and a simple one-lane footbridge, there should be no change in the current accessibility along Lagunitas Creek. If this is not possible, Alternative D - the Environmental option - is the best and only choice.

Susan Prince
11180 Sir Francis Drake Blvd, PRS



William Prince
<princew@horizoncable.com>

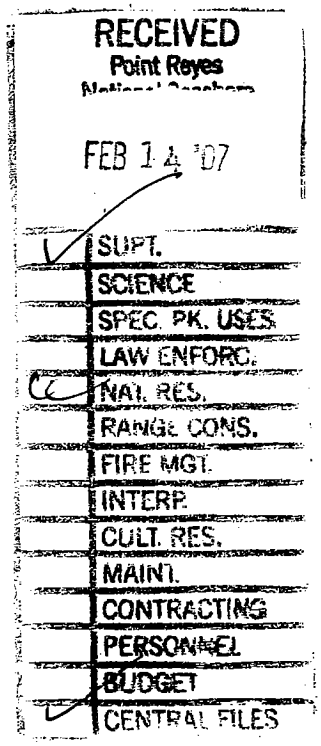
02/13/2007 10:26 PM PST

To: park_planning@nps.gov
cc:
Subject: alternative D

> Superintendent, Pt. Reyes National Seashore Point Reyes, Ca.
> 94956 Attn: Giacomini Wetlands Restoration Plan
>

I support Alternative D for the Wetlands Restoration Project. Please choose to protect our most valuable resource in this way.

Sincerely,
William Prince
225 Camino Del Mar, Inverness
Po Box 767, Inverness
415-669-7332



Feb 8 2007

THOMAS QUINN
ARTIST
PO BOX 225 . POINT REYES STATION . CALIFORNIA 94956

RECEIVED
Point Reyes
FEB 9 -07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

National Parks Service

Don:

May we keep the oregnal goals of this wetland.

We endorse Alternative D.

Additionally—

1. Purchase the entire ranch and remove the possibility degradation by Development on the edges of this important restoration as well as a small unique Village. (wellfully avail yourself of Prop 84 funds)
2. No bridge to nowhere - spend the savings on the protections listed above.
3. address the significant effects of 2 drainage sites of the Village pollutes surface runoff water)
4. removal of Riprap installed by the Army Corps in 1983 — the year after Lagunitas Creek flooded and attempted to relocate its streambed.
5. be aware of the new projected changes in sea level through Global warming.
6. be alert to a Willow invasion from the South of the wetland.

2.

THOMAS QUINN
ARTIST

(415) 663-1770

PO BOX 225 . POINT REYES STATION . CALIFORNIA 94956

7. request the County remove the Cypress trees on C Shed ... they were planted to screen/obscure the Soaping Barn.

8. Consider leaving island segments of the north and south levees at removal time.

9. Soil removal on the east side of the creek should be routed on Central ranch road and not up third Street. This residential neighborhood with its people (children), dogs, and quietude has been disregarded and menaced enough by the dairy.

Sincerely

Tom and Jeri Quinn

C H R I S R E D I N G

Post Office Box 252
36 Cypress Road
Point Reyes Station, CA 94956

415 663-8266

February 14, 2007

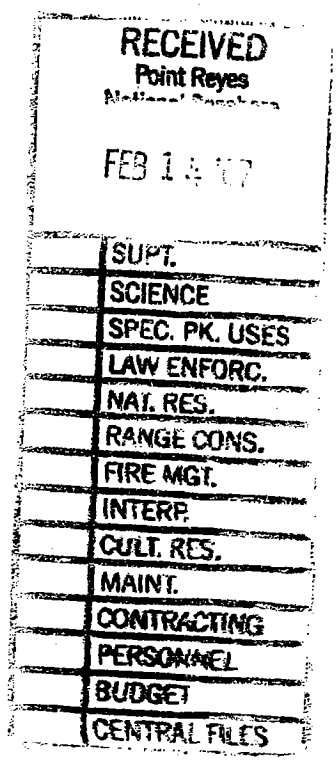
Point Reyes National Seashore
National Park Service

RE: Giacomini Wetlands Restoration

I support Plan D as I am concerned that the traffic and parking issues that could arise from the Wetlands restoration and public access in the vicinity of the town may degrade the pedestrian character of the community and our quality of life.

Sincerely,

Chris Reding



"Lisa Ridge"
<lisa.ridge@gmail.com>
02/14/2007 08:07 PM
PST

To: pore_planning@nps.gov
cc:
Subject: wetland restoration

Dear Mr. Neubacher:

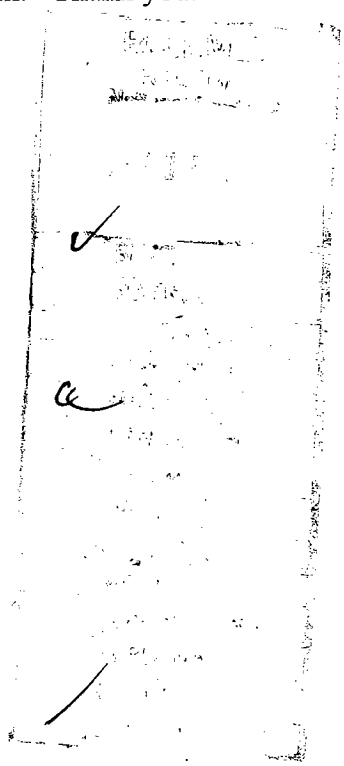
I am writing to you about the Giacomini Restoration Plan at Tomales Bay. As a long-time resident of Marin (my parents also live in Point Reyes) I cannot emphasize the importance of Western Marin's world-famous beauty and diverse wildlife. Accordingly, I appreciate Point Reyes National Seashore's plan to restore the wetlands at Tomales Bay, which will do so much to enhance local wildlife.

But I think we should do as much as possible to save the wetlands, so I hope you will support Alternative D. I support Alternative D because it goes a step further in restoring the wetlands and, concomitantly, the wildlife that they sustain.

In addition, I support the construction of a bridge over Lagunitas Creek and the trail connection between Green Bridge and White House Pool, as part of the restoration plan. Thank you.

Sincerely,

Lisa Ridge
Novato, CA 94947 (formerly in Inverness)



Russell Ridge
<theridges@telescience
.net>
02/13/2007 10:20 AM
PST

To: <pore_planning@nps.gov>
cc:
Subject: Tomales Bay Wetlands Restoration Project

To Don Neubacher, Supt.
Point Reyes National Seashore

Dear Don,

Sorry to be so late in submitting our comments. My wife and I would respectfully ask that the park service support Alternative D for the wetlands restoration: maximize marsh development and minimize human 'footprints' on a nature area.

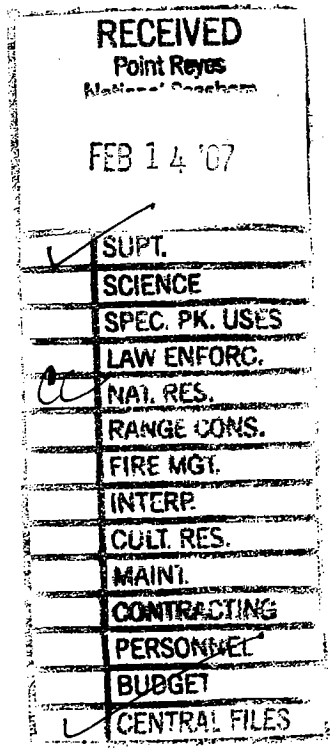
I(Russell) am a retired professor of biology, College of Marin. One of my biology 'heroes', Garrett Hardin of U.C. Santa Barbara, had polio as a child. I was impressed when he stood with the aid of crutches at an open hearing and defended wilderness areas. "These are areas that should have limited access." He would deny access to himself, but knowing that they existed was the greater good. This is the opposite attitude of the person from Novato(whose name I won't list) who got up at a public hearing in the early days of The Pt. Reyes Nat'l Seashore, and pleaded for a road through the middle of the seashore(now designated as 'wilderness), so that he could drive his elderly grandmother through the area. "We're paying for this park, so we should be able to use it". What a lack of understanding for the integrity of nature areas!

A few paths and/or observation sites around the edges could be permitted, but please keep traffic out of most of the marsh land. This is not that large an area to be invaded by humans.

Sincerely,
Russell and Margaret Ridge
Inverness Park
P.O. Boox 396, Pt. Reyes Sta.
663-1716

RECEIVED
Point Reyes
National Seashore
FEB 13 '07
✓ SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
cc NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
✓ CENTRAL FILES

Dennis and Judy Rodoni
P.O. Box 254
Olema, Ca. 94950
415-663-8370



February 13, 2007

Don Neubacher, Superintendent
Point Reyes National Seashore
Point Reyes Station, CA. 94956

Regarding: Giacomini Wetland Restoration

Dear Don,

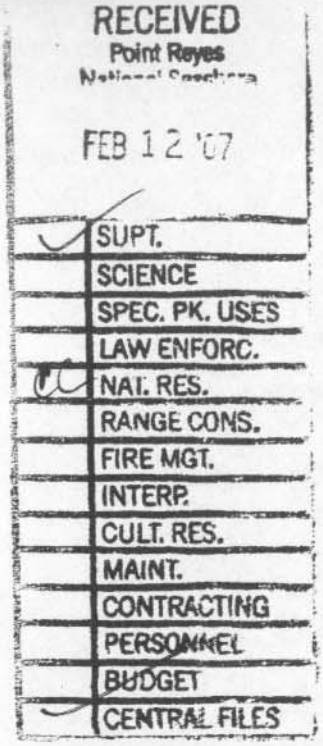
First of all we would like to thank the park for having this public dialog related to addressing alternatives for the Giacomini Wetland Restoration. Your process has proven to be through, educational, and a very transparent process. You and your staff should be thanked for this effort.

We believe that Alternative D provides us with the best possible wetland restoration with the most benefit for our environment and surrounding communities.

Some of the other alternatives discuss access possibilities, but our preference would be to provide the very best possible wetland restoration, with viewing areas for education and enjoyment, but very little human footprint into the wetlands

Sincerely

Dennis and Judy Rodoni



February 10, 2007

Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956

Dear Sir:

My family settled in Bodega in 1851, establishing ranches in the area, and building summer homes at Dillon Beach, which we visit regularly.

As an educator and writer, I have written numerous articles about the history, wildlife, and birds of the area in national and regional magazines.

I am thrilled that the Giacomini pastures will be restored to Wetlands. However, I am strongly in support of Plan D, which I believe will increase and protect habitat, as well as a free-flowing stream. Plan C would increase traffic, noise, and congestion, that will infringe upon the delicate, ecological setting.

Sincerely,

Kenn S. Roe

Kenn S. Roe
3325 Saint Moritz Court
Redding, CA 96002

cc: Jon Jarvis

"Mark Ropers"
<mcropers@horizoncable.com>
02/14/2007 11:18 AM
PST

To: <Park_Planning@nps.gov>
cc:
Subject: Giacomini Wetlands Restoration - Alternative D

Dear Superintendent Don Neubacher:

Having read about the various alternatives in aregard to the restoration of the Giocamini Wetlands. I have also read in The Point Reyes Light that The Park seems intent on implementing Alternative C. I request that you give such a leaning further thought and instead implement Alternative D.

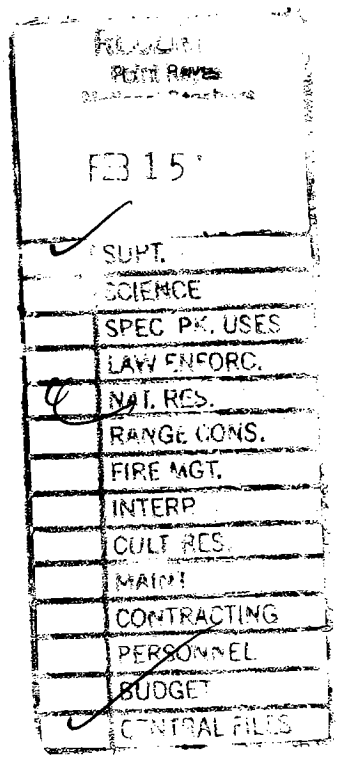
Alternative D is the more pure avenue to take and one which still allows us to enjoy the restorned wetlands - only in a more pure fashion. And pure fashion appears to be the vision of the Park on so many other matters! Thus it should be a natural for you to choose.

I really hope that you do not build a bridge across Lagunitas Creek. That option simply is an expenditure of money you do not need and it would detract from the beauty of the restored wetlands. As much as we are looking forward to the restoration of the wetlands, we do not want it to become an amusement park with parking problems, crowds, etc.

Please implement Alternative D.

Very truly yours,

Mark Ropers
P.O. Box 883
Inverness, CA 94937



Charles Gay/Pamela Ross
<rossgay@mos.com.np>
02/14/2007 10:13 AM
ZE5C

To: pore_planning@nps.gov
cc:
Subject: Giacomini Wetlands

Dear Don,

Although we live on Inverness Ridge for only half the year and are currently at our winter home in Kathmandu, Nepal, we have been following the Giacomini Wetlands restoration proposals online and want to add our comments on the various alternatives presented.

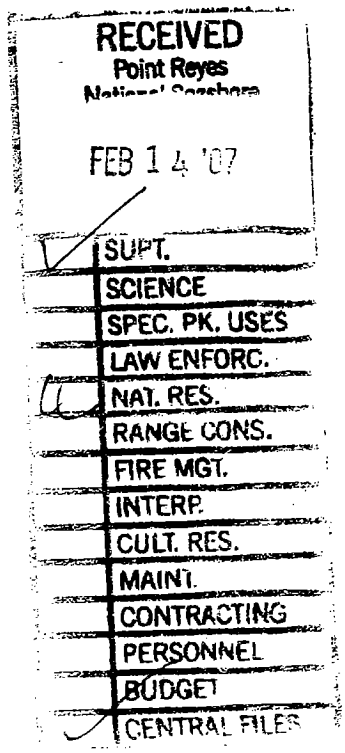
We are in favor of Alternative D, with the addition of a bridge to make a trail connection from White House Pool to Green Bridge. In general we support the most extensive possible restoration of the Tomales Bay wetlands, and are willing to give up most public access in order to achieve that restoration. But we also believe that the trail connection would be of enormous value to our communities, and that it could be designed in such a way as to encourage walking use only and discourage or prohibit other use (i.e., bicycles). A bicycle lane on Levee Road would be a safe and useful addition.

Thank you,

Pamela Ross & Charles Gay
60 Drake Summit Rd.
Inverness CA 94956

DOE-See att'd

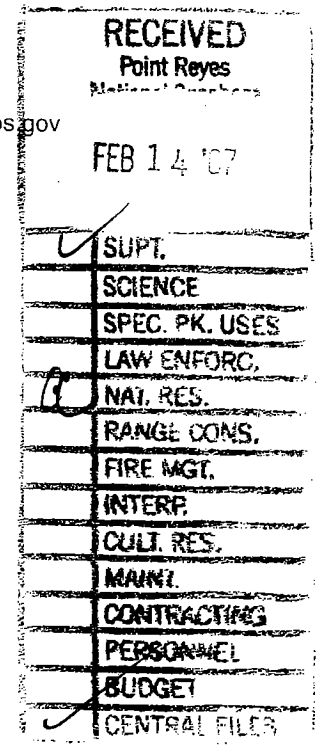
PS--Please cancel our email of Feb. 13--it was sent in error before we had fully understood the alternatives. Thanks.



Jonathan Rowe
<jonrowe@earthlink.net
>

02/13/2007 11:28 PM
PST

To: park_planning@nps.gov, jon.Jarvis@nps.gov
cc:
Subject: Giacomini Wetlands -- For Alt. D



February 13, 2007

Superintendent
Point Reyes National Seashore
Point Reyes Station, CA 94956

Dear Superintendent:

I have to support PLAN D for the Giacomini Wetlands. This is not because I am against public access, but because the alternative - Plan C - is unfitting both for this community and for the wetlands themselves.

For example, it would be good to have a footpath to connect Inverness Park to Point Reyes Station. However, as I understand it, Plan C would give us not a footpath but rather something approaching a narrow road. This likely would become a highway for bicycles on weekends. What about people who walk, especially small children?

Already we have to dodge the bikes that come at us two and three abreast as we walk along local roads. Now we could have the same experience in what is supposed to be a quiet and natural wetlands?

The same question applies to the parking area and access point proposed for the area that is now farm worker housing off of Mesa Road. Perhaps you are not aware that Mesa Road is much used by walkers. People walk their dogs and walk to town; some walk just for the fun of it. Most days I walk my son, who is four years old, to preschool, and then back again in the afternoon.

Now you are proposing to put a parking area along this road that many people are walking? I'm going to have to contend with park traffic as I walk my son to school? Walking is something to be encouraged, not run off the road. I hope you are prepared to install a sidewalk along Mesa Road - currently there is none - because we residents are going to need one if we have to face park traffic in the street.

Please pause a moment to reflect upon the irony. As part of a project to restore a wetlands to its natural state, you are proposing to increase automotive traffic in a residential area next to that wetland. You do not need to do this. There is parking already at the elementary school on weekends. More parking is coming soon on the new lot behind main street on the Ecumenical Housing site.

Both of these lots are just a short walk away. They exist already (or will shortly, in the case of the EAC site) -- as do the lots at White House Pool and the Olema Marsh. How much more parking and access do you

need for this one wetlands, especially considering the spacious National Seashore parklands (and parking) that are nearby?

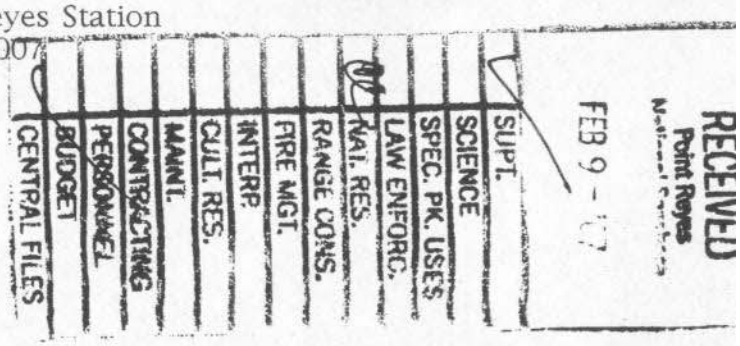
For these reasons among others, I urge you to go with the plan that does the most to advance the core purpose of this restoration project - that is, Alternative D.

Thank you.

Sincerely,

Jonathan Rowe

Point Reyes Station
Feb. 7, 2007



Superintendent Don Neubacher
Giacomini Wetlands Restoration DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Giacomini Wetlands Restoration Project

Dear Superintendent Neubacher,

As a long time resident on Mesa Road, I am advocating the implementation of Alternative D for the following reasons:

1- The area where Tomasini Careek enters the bay has a distinctive riparian habitat condusive to the preservation of red-legged frogs, tide-water goby and steelhead trout. If a walking trail is installed, that, and a parking area and toilet may upset this delicate balance.

2- The proposed walking trail will destroy the quality of life - quietude and privacy of those residents on the bluffs and plateaus above.

3- The hunting shack may invite vandalism and parties by teenager and others looking for a place to do so. Also this area may be difficult to police and enforce against trouble-makers and vandals.

4- The NOISE generated by large groups of people will inhibit the finding of a new protected home to the thousands of animals and birds who will find a sanctuary here.

As a hiker of all the trails in Marin County, I have discovered there are trails for everyone: horseback riders, cyclists, day hikers, bird-watchers and overnight back-packers camping out. How about an area specifically for the birds and beasts?

The Olema Marsh has one fine overlook, a viewpoint from the bluff above that lets the animal and birdlife go about their business down below, as observers (humans) above can observe them in quiet. A perfect arrangement of live-and-let-live exists between the human and animal kingdoms without the birds and animals being disturbed.

Cannot the same thing be made of the Martinelli Ranch trail? It is accessed by way of Hwy. 1, north of town. It has a parking lot and well out of the way of residential areas, thus avoiding traffic and pedestrian congestion. It offers from the bluff above, as at the Olema Marsh, a magnificent overview of the bay below, much grander in fact, because the bluff or plateau above it is at a highter altitude, affording the observer magnificent views all the way to the North where the mouth of Tomales Bay breaks into the Pacific and to the South and across to the Shoreline on the West, encompassing from this vantage point all therein (birds and animals) which the restored wetlands will contain.

Thank you for your consideration. Regards,

John C. Sakellar

John C. Sakellar (resident Mesa Rd.)
P.O. Box 610
Point Reyes Station, California
94956

(custer@svn.net)

cc: Jon Jarvis

Lorraine

January 22, 2007

Superintendent

Pt. Reyes Natl. Seashore
1 Bear Valley Road
Pt. Reyes Station, CA. 94956

Dear Don and Lorraine,

My name is Marianne Sakellar, and I live at 350 Mesa Rd, on the hill directly above the proposed wetlands restoration at the southeastern perimeter in Pt. Reyes Station. Thank you for sending me the letter # L7617 regarding the Giacomini Wetlands Restoration Plan, which I have read and understand. However, I fail to understand why there isn't a plan that suggests NO public access. I thought that the wetlands restoration was for the benefit of wildlife, plant and animal in general, and the endangered tidewater goby, in particular, as well as the red-legged frog, and steelhead trout. Public access, by definition, would disturb that very noble goal. We have so many thousands of acres of public access here in Marin, with trails, facilities, parking extant, we do not need more. Please leave the animals alone. They will thrive without human encroachment, but will be slower to nest, slower to breed, slower to feed while subject to our presence and our noise.

To my knowledge, in Marin we do not have public access this close to homes. Because my neighbors and I would feel the brunt and dangers of public access, I am very worried about the close proximity to our homes of this proposed spur trail on the southeastern perimeter. I worry about safety, noise levels, and loss of privacy. I actually think these would be the personal concerns of the wetlands wildlife, as well, if they had a voice.

I worry about fire. Our prevailing winds are from the southwest. Groups of walkers, birders, bicyclists who would come in the daylight or teenagers there at night partying could easily start a fire that would sweep up this hillside very quickly. Because of the very private location and easy access from Mesa Rd., a spur trail would invite activity down there, particularly at night, but also in the daytime, that would endanger our safety. It only takes a burning cigarette carelessly discarded. We have elderly, children, animals, and numbers of folks who might just be sleeping. We could easily suffer loss of life and destruction of property. We have thus far had to monitor occasional bonfires on that trail late at night – illegal, but not overseen by law enforcement. Please check the police reports. How **would** this proposed spur be policed? How **could** it be?

My second concern is noise. There have literally been countless times that we on the hillside have had to stay inside with our windows shut because of the noise coming from the trailers. This is hard on summer days. I have discovered that sound travels upward and again, with the prevailing breezes, the sound is further carried right into our homes.

Conversations, music, yelling, laughter, kids, dogs, arguments … we get it all, day and night. It is hard to be assailed by other peoples' noise when we ourselves seek the quiet. We've paid our dues, believe me. Being forced to hear music and conversations, particularly among groups of people is disturbing, and if I am disturbed by it, imagine how the wild animals will react. My hunch is they will make themselves scarce.

I also am very concerned about my family's loss of privacy. We will be entirely visible, and for those of us who live outside the town and enjoy the privacy this affords, the proposed spur trail will be an invasion. I am particularly worried about a possible parking lot and latrine, and the attendant traffic that this would attract on Mesa. Visitors to Pt. Reyes would come to use the latrine to compensate for the single public bathroom in the town. It would increase traffic and noise on Mesa. It might just smell awful, too. It would be a sensory blight and would, I am sure, drive down our property values.

In conclusion, I ask you to please propose a No Public Access Plan in consideration of the wildlife we hope to preserve in the wetlands, and in consideration of the families here that a proposed spur trail would so negatively effect. I refer you to the enclosed paper authored by Gordon Bennett, representing the Sierra Club, dated July 2004, most particularly to the last paragraph on page two.

I am with respect,
Marianne Sakellar

Marianne Sakellar

msakellar@marin.k12.ca.us

cc: Jon Jarvis

M. Sakellar
P.O. Box 112
Pt. Reyes Sta., Ca.
94956

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Hi - Lorraine had mentioned that a foot trail beyond Whitehouse pool was not being considered because the person on the path could look right into residents' backyards — it's the same on the Mesa. If you create a spur, users would be in our front yards — entirely visible. Please — no spur on Mesa. Go D

[illegible signature]

Superintendent
Pt Reyes National Seashore
1 Bear Valley Rd
Pt. Reyes Station, CA
94956

350 Mesa Rd
Pt Reyes Sta
94956

RECEIVED
Point Reyes National Seashore
FEB 7 - '07

SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

RECEIVED
Point Reyes
FEB 9 - '02
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Feb. 6, 2002

Superintendent

Pt. Reyes National Seashore
1 Bear Valley Road
Pt. Reyes Station, CA. 94956

Dear Don and Lorraine,

Thank you for such an informative and well-run meeting.
I still do not understand why public access should be part of this equation in planning for restoration of the Giacomini Wetlands. It was not part of the original charge of the park service, and I'm sorry that public pressure is making inroads. I see our lovely community going the way of Sedona, Arizona and Moab, Utah ... completely taken over by tourism and special interests such as bike coalitions.
Since you advised us to write our choices, here are mine:

First choice: Leave the Wetlands alone

Second Choice: Proposition D

Please do not put a spur trail on Mesa.

Thank you,
Marianne Sakellar

Marianne Sakellar

350 Mesa Rd.
Pt. Reyes Station
msakellar@horizoncable.com

Point Reyes Station
Jan. 15, 2007

Dear Don and Lorraine,

I welcome the idea of a public path along the old railroad right of way. So it was with surprise that I learned from the Coastal Post that a public parking lot is planned off Mesa Road.

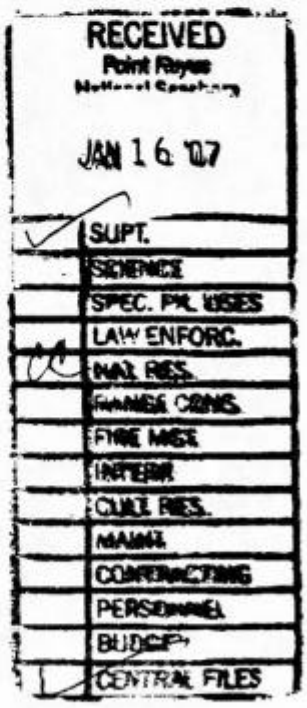
I feel I speak for many Pt. Reyes residents who welcome Park visitors. Local businesses and employees depend upon them. However, many of us feel pushed out of these places especially on busy weekends. Considering the wealth of resources in the nearby Park, I would appreciate your consideration of a modest, of interest to wildlife watchers, non-vehicular resource of interest mostly to residents.

Sincerely

Nancy Sakellar

Nancy Sakellar
P.O. Box 610
Point Reyes Station
California
94956

custer@svn.net



Point Reyes Station
Feb. 7, 2007

Superintendent Don Neubacher
Giacomini Wetlands Restoration DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Giacomini Wetlands Restoration Project

Dear Don and Lorraine,

I strongly support the adoption of Alternative D, the environmentally preferred option.

The Public Access portion of Alternative C would lead to unacceptable levels of traffic, noise, pollution, and interference with the project aim, that is restoration of the wetlands and protection of habitat for the species that live there.

I thought the mood of the January 25 community meeting was definitely for Alternative D.

Thanks.

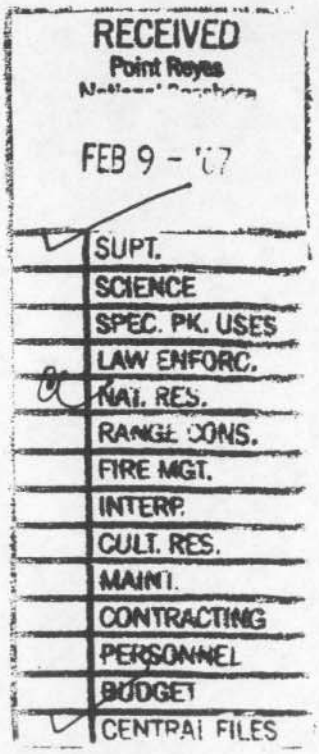
Sincerely

Nancy Sakellar

Nancy Sakellar
P.O. Box 610
Point Reyes Station, California
94956

(custer@svn.net)

cc: Jon Jarvis



RECEIVED
Point Reyes
National Seashore
FEB 9 - '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE/CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

request this prominently at the beginning of your comments. Please include a rationale for your personal information being withheld from public review that demonstrates disclosure would constitute a clearly unwarranted invasion of privacy. Unsupported assertions will not meet this burden. In the absence of exceptional, documentable circumstances, this information will be released. Submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will always be made available for public review in their entirety.

Address written comments to: ATTN: Superintendent, Giacomini Wetland Restoration Project DEIS/EIR, Point Reyes National Seashore, 1 Bear Valley Road, Point Reyes Station, CA 94956. You may also **email** your comments. Please reference the Giacomini Wetland Restoration Project in the subject line.

A **Notice of Availability** (61 KB PDF) has been published in the Federal Register and on December 13, 2006, Superintendent Don Neubacher issued a **letter** (20 KB PDF) notifying interested parties that this DEIS/EIR was available for review and comment.

Top of Page

Complete Document PDF (146 MB) (coming as soon as we can get it uploaded)

This document has been divided into smaller-sized files so that visitors with slower internet connections have the option of downloading desired chapters and/or figures separately if they do not wish to download the complete document as a single large file.

Please put my vote in for Dr

Thanks Shirley Salz

Document Chapters (Figures Included)

Cover (1,053 KB PDF)
Abstract/Executive Summary (pp. i - xlviii) (20,078 KB PDF)
Table of Contents (pp. il - lvi) (73 KB PDF)
Acronyms (pp. lvii - lx) (53 KB PDF)
Chapter 1: Purpose and Need for Action (pp. 1 - 26) (3,171 KB PDF)
Chapter 2: Alternatives, Including the Preferred Alternative (pp. 27 - 126) (35,899 KB PDF)
Chapter 3: Affected Environment (pp. 127 - 330) (46,458 KB PDF)
Chapter 4: Environmental Consequences (pp. 331 - 640) (5,995 KB PDF)
Chapter 5: Consultation and Coordination (pp. 641 - 654) (440 KB PDF)
Literature Cited (pp. 655 - 676) (142 KB PDF)
Index (pp. 677 - 684) (53 KB PDF)
Appendices (pp. A-1 - A-12, B-1 - B-28, C-1 - C-17) (5,927 KB PDF)

Top of Page

Document Chapters (text and figures separate)

SHIRLEY SALZMAN
Box 1455
Point Reyes Station
California 94956

Abstract/Executive Summary (pp. i - xlviii) (277 KB PDF)
Table of Contents (pp. il - lvi) (73 KB PDF)
Acronyms (pp. lvii - lx) (53 KB PDF)
Chapter 1: Purpose and Need for Action (pp. 1 - 26) (278 KB PDF)
Chapter 2: Alternatives, Including the Preferred Alternative (pp. 27 - 126) (875 KB

Graciela

Wendy Schwartz
<wenpaint@horizoncable.com>
02/11/2007 03:32 PM
PST

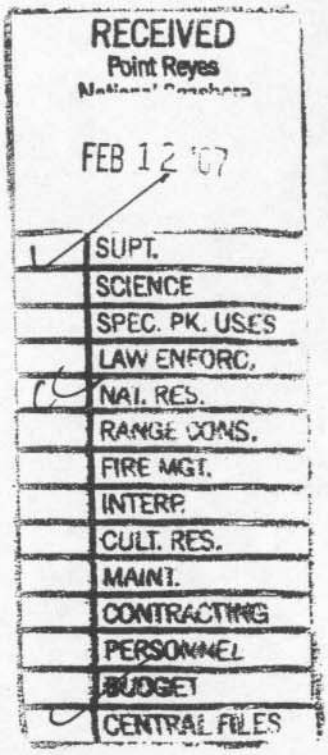
To: <Park_Planning@nps.gov>
cc:
Subject: The Giacomini Marsh

Dear Don,

I don't do well with letters like these, so I'll just say I am strongly in favor of Alternative D—more emphasis on environmental restoration and less on human access. There is already enough of the latter.

Keep up the good work!

Wendy Schwartz



"Rishi Schweig"
<rishi.schweig@gmail.com>
02/13/2007 01:48 AM
PST
Please respond to
rishischweig

To: Park_Planning@nps.gov
cc:
Subject: Giacomini restoration

I realize that you are hearing many voices in our community debating the difference between Plans C and D. I am writing to suggest that the entire community - residents and visitors - will be best served by a plan that includes a bridge across Lagunitas Creek.

Such a bridge will provide a valuable connection between the existing park holdings and the newly acquired ranch. It will enable hikers, cyclists, and hose riders to avoid the most dangerous and congested sections of the highway while continuing to enjoy the park all the way from Bear Valley to the village itself.

I was privileged to walk the entire property a few years ago, participating in the early survey work. I am excited to see the changes as the old pastures become wetlands and the rich mix of wildlife does even more to restore the earliest uses of this beautiful piece of property.

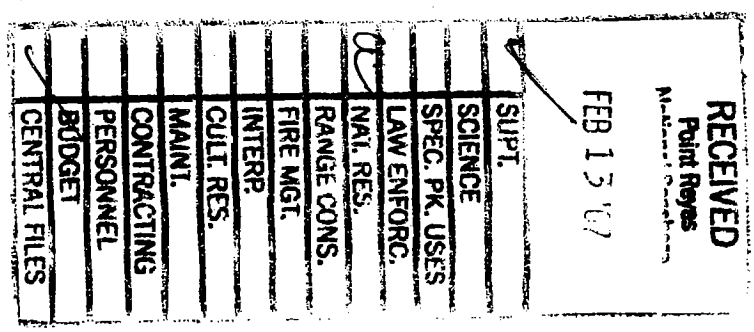
Still, the use of the land must include a reasonable, careful use by human beings. On the one hand, we all live here together, and locking this valuable land away would reduce its viability. On the other hand, no one wants to see this become an area sacrificed to sprawling parking lots or paved 10 foot wide paths.

A properly maintained path near Lagunitas Creek will not reduce the wetlands being restored, nor will it disrupt habitat of sensitive species. I am quite concerned that construction of facilities farther north of town, on the east side of the Giacomini property, might not be as suitable - for both of these reasons.

I support a blend of Plans C & D, keeping parking nearer the green bridge, removing all structures possible from the property. I strongly request, for safety, comfort, and enjoyment of what we own, that a bridge be built as as early as possible, providing a continuous path from the village at least as far as White House Pool, and preferably past Inverness Park as far as the old north levee.

I deeply appreciate all the work done by Don and park staff. I have enjoyed reading the EIS and poring over the maps and charts. Thank you for seriously accepting your role as citizen in this community.

Sincere Thanks,
Rishi Schweig



Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Will the tidegates on ~~the~~ Fish Hatchery Creek be removed under the current proposal?

rishi.schweig@gmail.com

Moreva Selchie
<mselchie@horizoncable.com>

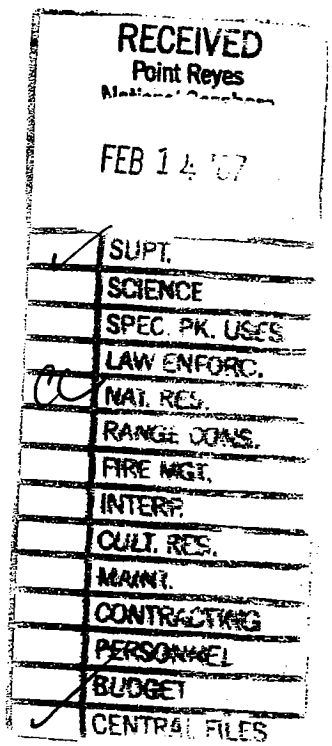
02/13/2007 11:05 PM
PST

To: park_planning@nps.gov
cc: jon_Jarvis@nps.gov
Subject: Attn Giacomini Wetlands Restoration Plan

I vote for alternative D plus the bridge to connect existing trails Inv. Pk to PR Stat.

I've been a homeowner here since 1968 and was in the local lobbying that stopped the diking at its present extent. Thanks for the Restoration Plan! Please go slowly, slowly for the sake of plants and wildlife during the efforts to restore.

Moreva Selchie, PO Box 82, Inverness



Marie Yvonne Severitti
20 Tomasini Canyon Road
P.O. Box 1166
Point Reyes sta., CA 94956
(415) 663-9293

RECEIVED
Point Reyes
National Seashore
FEB 15 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

February 12, 2007

Superintendent of Point Reyes National Seashore
Point Reyes, Sta., CA 94956

Re: EIS/EIR: Giacomini Wetlands Restoration Plan

Dear Superintendent:

This letter is to comment on the alternatives presented in the EIS/EIR for the restoration of the Giacomini wetlands. My comments to said EIS/EIR are as follows.

1. **I support Alternative D.** It is my opinion that the increase in excavation to inter-tidal elevations in the southern portion of the east pasture, as shown in the plan/map for Alternative D, would be best for the habitat and the overall restoration of the wetlands.

2. **I am not in favor of the proposed walk/bicycle bridge** as discussed in Alternative D. I am not convinced there would be enough use of said bridge to justify the cost. The bridge may create the need to channel water flowing from the creek impairing restoration and/or the natural flow of the creek. Also, the bridge may impact scenic views. Reasonable improvements could be made to the Green Bridge and along Levee Road facilitating bicycles/walking, etc.

3. The Mesa Spur Trail mentioned in Alternative C could be problematic and is likely to have little use due to its out-of-the-way location.

4. Entrance to the Overlook should be far enough from the residential area to preserve its integrity. Traffic, noise, litter, etc. disrupt the quiet enjoyment residents are entitled. Please help preserve the residential area as an integral part of our community.

Thank you for your consideration on these comments.

Sincerely,

Severietti

Marie Y. Severietti

"Susan Seymour"
<Susan_Seymour@pitzer.edu>
02/13/2007 03:16 PM
PST

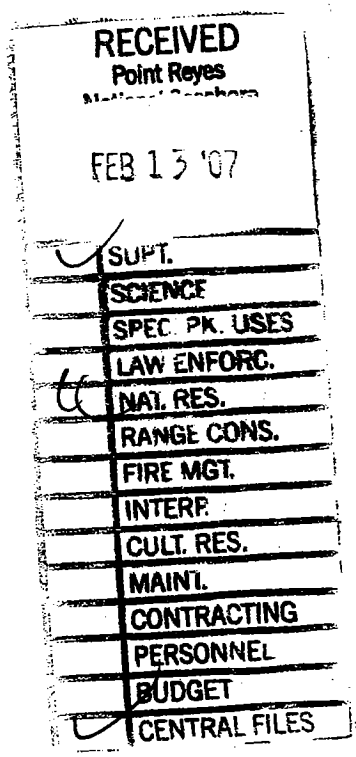
To: <park_planning@nps.gov>
cc: <Jon_Jarvis@nps.gov>
Subject: Giacomini Wetlands Restoration Plan

We strongly favor Plan D for the Giacomini Wetlands Restoration

We live in Inverness Park where we look down on the to-be-restored wetlands, which we have been looking forward to for the past 25 years--ever since the park made this critical property part of its desired expansion. Now it should be restored in a way that best protects threatened wildlife Humans to not need full access to an area that is so environmentally sensitive and critical to the well-being of Tomales Bay, the Coho salmon, etc. We already have an incredible luxury of trails in the park

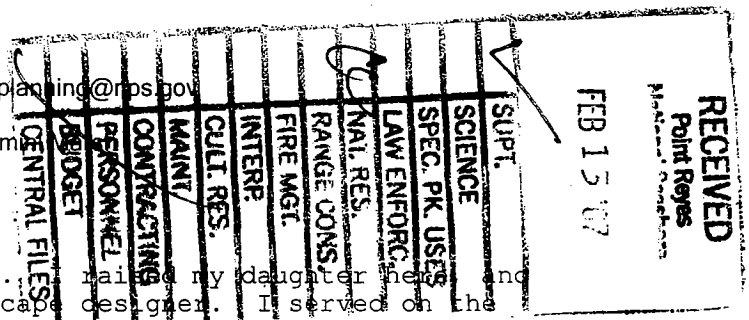
Thank you for your consideration

Susan Seymour & Laurence Graham
57 Laurel St.
Inverness Park, CA



nancy stein
<nanstein@svn.net>
02/12/2007 11:51 AM
PST

To: pore_planning@nps.gov
cc:
Subject: Giacomini Marsh



I am a 30 year resident of West Marin... raised my daughter here, and have worked for many years as a landscape designer. I served on the EAC board for 4 years, and am very active in the environmental community.

I strongly support a bridge connecting the white house pool area with the trail into the Marsh.

All of the residents of Inverness and Inverness Park rely mainly on the town of Pt. Reyes for supplies, community and health. Of necessity, we are the major users of automobiles in Pt. Reyes. As the town grows, it becomes more and more important to connect the Inverness users to Pt. Reyes by means other than cars. Parking lots are not what the people of Pt. Reyes want to see!

Parking at White House Pool, and traveling by foot or bicycle to Pt. Reyes would mean a bird watching opportunity in a day of errands! It would also connect school children from Inverness Park to the School. It would mean a lot to middle and high school children who might want to stay in town after school for activities, but would miss the bus as a result. I know as a parent that I would have felt a lot more comfortable with my child walking in a marsh rather than a busy highway.

I oppose the use of the Green Bridge as the access point to Pt. Reyes. The proposed trail into Pt. Reyes via the Green Bridge would mean many problems such as widening the road; and it is a much less desirable way to access the town. It could never provide the safety and enjoyment that the bridge across the creek that would connect to the trail leading into town would give. Because of this, a "bike trail" into town along Sir Francis Drake is not going to get the use of children and people like myself, 60 years old...I simply do not feel safe riding a bike along the highway, no matter how wide the trail!

It seems to me that the Giacomini Marsh was purchased by the National Park, not the Nature Conservancy. I believe that the public can interface with wildlife in ways that benefit both; and that with proper engineering, the humans using the trail will not harm the birds and wildlife in the marsh, and may in fact, become more knowledgable and interested in protecting the environment, because they use it. Closing people out of the wetlands in a place so close to town, a place that is caught between heavy traffic and development seems wrong to me.

4th street also seems like a better access point to the wetlands than 3rd, since it's already a commercial street, which passes by the fire station and the storage unit.

Please consider the Martinelli property just outside of Pt. Reyes Station. Although it has a long trail, accessed by foot traffic and horses, it's been a great connection to the bay and the wildlife along that corridor, and I am not aware of any heavy or inappropriate use by humans.

I understand that the people living on the bluff above the bay may not want a trail along the old railway right of way. With the exception of that piece of trail, I fully support Alternative C and the multiple use of the wetlands.

I do believe that the citizens of Pt. Reyes have the right to complain about the "outsiders" who come to our area. The National Seashore belongs to all the people in the world who come here, and I for one, think those people learn a great deal about nature, and are taught to

protect it by the inspiration and familiarity they gain by using it.
Sincerely,
Nancy Stein

"Britt Stitt"
<bstitt@lovett-silverman.com>
02/13/2007 06:33 PM
PST

To: <Park_Planning@nps.gov>
cc:
Subject: Gicomini Marsh Restoration

Don Neubacher
Superintendent Point Reyes National Seashore

Subj: Giacomini Marsh Restoration

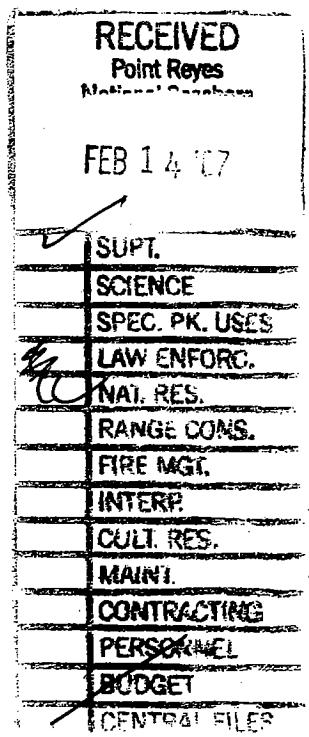
Dear Superintendent,

Please add my vote of confidence to Option D, the full environmental restoration plan. I have done some consulting for the park---Chimney Rock Pier--- and will be glad to donate my engineering and estimating time towards the project.

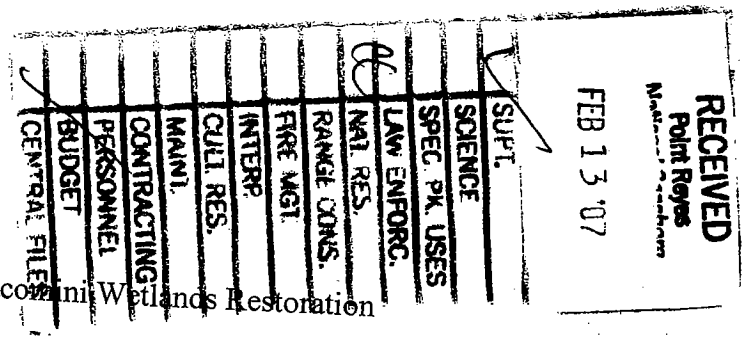
Sincerely,

Britt Stitt

PO 351
Inverness, CA 94937
415.559.0095



February 12, 2007



Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

Re: Comments on the Draft EIR: Giacomini Wetlands Restoration

Dear Supt. Neubacher,

I am a wildlife biologist and a long-time weekend resident of Point Reyes Station. With some regularity, I walk and birdwatch on the North Dike, and the old Martinelli property.

The quality of the biological section of the draft EIR is impressive. I was, however, disappointed that the Park chose Alternative C as the preferred alternative. Alternative D, the "environmentally preferred alternative", is clearly the best option to restore the health of Tomales Bay. Humans have many hiking choices in Point Reyes National Seashore, but black rails have few habitat options in West Marin.

I encourage the Park to focus on the following:

1. Limit public access to the downstream portions of Lagunitas, Bear Valley, Olema, and Tomasini creeks. This will maximize the habitat potential for numerous listed species at the critical transition zone of fresh/brackish/saline waters.

2. Implement Alternative D without the bridge across Lagunitas Creek. The bridge is very expensive and not the best use of taxpayer's dollars. At best, the trail will be seasonal and will experience occasional flooding. If an expensive engineered item is added such as the bridge, there will be pressure on the Park to eventually "improve" the trail through hardscaping and increased elevation of the trail that will further impact wildlife.

3. Maximizing restoration potential at Olema Marsh by creating conditions that produce the largest tidal prism and tidal access.

The Draft EIR is deficient because it does not address the impacts of feral cats on the Tomales Bay marsh. Probably because of the active spay/neuter and release program, there are a number of free-range and feral cats in the immediate vicinity of the marsh, including the Hunt Lodge access area. Signs educating people about the negative impacts of cats on wildlife should be installed, and an active trapping program should be initiated.

Furthermore, the draft EIR is deficient because it does not address impacts to wildlife from dogs. Dogs should be prohibited on or near any trails on Tomales Bay. If I recall correctly, the policy at the Martinelli Open Space is for dogs to be on a leash. I have seen many dogs walked there, and they are almost never restrained. I have never seen an officer patrol the area. Given this poor track record of enforcement, and the failure of

dog owners to comply with regulations, I encourage the Park to prohibit dogs adjacent to or on Tomales Bay wetlands.

Although I have used the term "Giacomini Wetlands" throughout this letter, I strongly encourage the Park consider renaming the project and the site. With all due respect to the Giacomini family, they made a sizable profit from the sale of the property and do not need further recognition. I suggest calling the project "Tomales Bay Wetland Restoration".

With Alternative D, we will have a beautiful, ecologically-functioning Tomales Bay wetland where birders and biologists will consider vocalizations of black rail as commonplace, rather than an exciting novelty as we do now.

I think you for this opportunity to comment on the Draft EIR. I want to express appreciation for the staff time to produce such a beautiful and valuable document.

Sincerely,

Emilie Strauss
1606 Hearst Ave.
Berkeley, CA 94703

Kriel

FEB 16 2007

Chris Lish
Sent by: Loretta Farley

02/16/2007 11:56 AM
PST

To: strauss@haas.berkeley.edu
cc: Ann Nelson/PORE/NPS@NPS
Subject: Re: From NPS.gov: Giacomini Wetlands

DO NOT REPLY to this email, rather be sure to reply to PORE_Webmaster@nps.gov.

Dear George ,

Your message has been forwarded. If you have any other questions, please feel free to contact us again at PORE_Webmaster@nps.gov or check our website at www.nps.gov/pore.

Thank you for your interest in Point Reyes National Seashore.

Sincerely,
Loretta Farley
PORE Park Ranger

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

strauss@haas.berkeley.edu

strauss@haas.berkeley.edu

02/15/2007 03:19 AM
EST

To: PORE_Webmaster@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetlands

Email submitted from: /pore/contacts.htm

This is to support Alternative D with the possible exception of the bridge over the creek. There is plenty of opportunity for recreation in the Seashore, however the wetlands perform a unique function.

George Strauss 1468 Grizzly Peak Berkeley, CA 94708

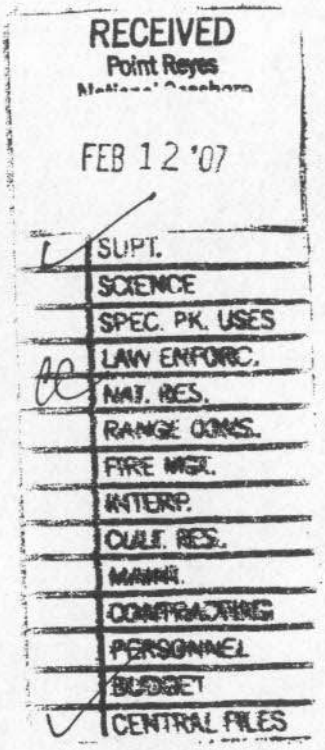
Carol Sweig
<carolsweig@yahoo.com>

02/12/2007 02:21 AM
PST

To: Park_Planning@nps.gov
cc:
Subject: Alternative D

Please choose this most protective plan. We have so little left!
Thank you.
Carol Sweig and Jim Lawry

Everyone is raving about the all-new Yahoo! Mail beta.



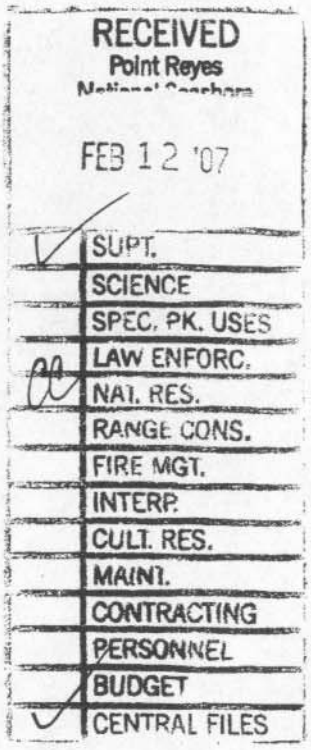
tortay2@yahoo.com
02/11/2007 01:34 PM
EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: Giacomini Wetland Restoration Project

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

We are writing to support Alternative C for the Giacomini Wetland Restoration Project. We live and work in Point Reyes and enjoy the expanding wildlife habitat. We believe Alternative would allow everyone, even those with disabilities, to enjoy the restored wetlands.

Thank you, Tor Taylor and Laurie Monserrat Point Reyes Station, CA



Richard Vacha
<rwvacha@horizoncable.com>
02/11/2007 01:47 PM
PST

To: park_planning@nps.gov
cc: jon_jarvia@nps.gov
Subject: Fwd: Giacomini Wetlands Restoration Project

RECEIVED
Point Reyes
National Seashore
FEB 12 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Begin forwarded message:

From: Richard Vacha <rwvacha@horizoncable.com>
Date: February 10, 2007 10:52:53 PM PST
To: parkplanning@nps.gov
Cc: kitty@overlook.com, jonjarvis@nps.gov, hath@horizoncable.com
Subject: Giacomini Wetlands Restoration Project

Superintendent, Pt Reyes National Seashore

Dear Sirs,

I have lived alongside the Giacomini fields for 25 years and have eagerly anticipated the day of its conversion back to natural wetlands. This is a tiny, but important, step in a badly needed shift toward restoring a damaged planet.

The stakes are high. The human race is beginning to wake up to the realization that the impact of modern civilization is endangering the viability of the earth itself to support life systems.

Every step towards restoration is critically important and must be undertaken with unprecedented clarity and boldness.

It is with this view that I urge you to adopt Alternative D as the plan which will, in the long run, be the best plan for Pt. Reyes and for the Earth. That would be a step in the right direction on the long road ahead toward preserving life on earth as we know it. The issue is nothing less than this.

Others have noted the specific local concerns--the effects on the town, quality of life in the neighborhoods, habitat pressures on sensitive species, etc. While I agree that Alternative D would be the best choice in all of these areas of concern, I urge you to support what is the only truly conscientious choice possible- the highest level of restoration and preservation.

The concerns about access and personal use of parklands, that many express will be shown in future years to be part of a terribly short-sighted and inadequate way of looking at the problems we face.

Making the choice for the highest preservation may be difficult now, but when you look back on this choice in future years, it will be obvious that is the correct one.

Thank you very much for being part of a restoration process that, no matter which Alternative is chosen, is a valuable step forward. I personally appreciate your efforts in this regard.

Richard Vacha

Dear Don Neubacher,

I am in favor of Plan C very enthusiastically. I now live in Marshall, but recently bought a place in Inverness Park on Sir Francis Drake.

Thank You —

R. VanDerMaaten

Rec'd 2/16/07

huntergatherer8@yahoo.com
02/15/2007 10:10 PM EST

To: pore_planning@nps.gov
cc:
Subject: From NPS.gov: restoration project at giacomini land

Email submitted from: /pore/parkmgmt/planning_giacomini_wrp_eiseir_draft_2006.htm

It looks to me like you are planning to spend a great deal of money and energy to do a big project when I would think nature itself, in the form of tides and annual floods, would bring about the restoration of a healthy marshland here. The islands that would be left where the current levies are would certainly provide good wildlife habitat. My six year old daughter and I live quite close to where this project would be going on and we certainly don't want to be exposed to the noisy and dangerous construction(or destruction)project you seem to be planning. Let nature take it's course. Sincerely; Hunter&Willow Wallof

Tanis Walters
PO Box 214
Pt Reyes Station CA 94956

Superintendent
Pt Reyes National Seashore
Pt Reyes CA 94956

Re:Giacomini Wetlands Restoration Project

Dear Don Neubacher,

First, let me commend you and the entire team for putting together a series of options that are well thought through and offer something for everyone.

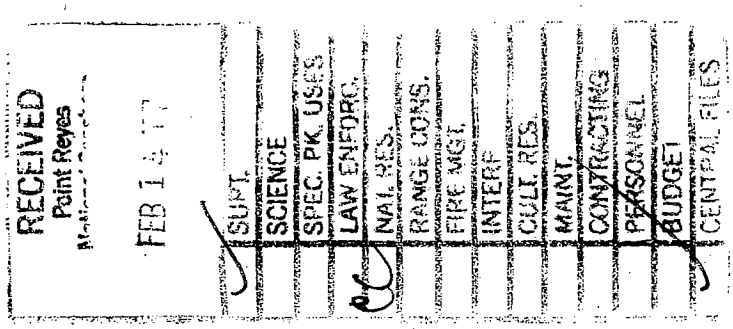
I have reviewed the summary of the Restoration Project and find that option C is the one that I support. The benefit to the environment are sufficient and, when weighed against the others, seems to be the best. While I would normally lean towards D, the lack of a connecting footpath to Inverness Park and the significantly greater number of loads of debris that will need to be hauled - at an environmental cost - tilt the scales towards C.

However, there are a few aspects of C that I question:

1. The view area off of Mesa Road is not necessary. When the benefits are weighed against the detriments, this part of the plan does not make sense. It will not be unique enough a view area to justify the cost and the inevitable disruption to the neighborhood.
2. The path from Pt Reyes to Inverness Park is an important addition to the community. I was shocked to learn of the cost for the bridge which would be built. Is it possible to consider a less costly bridge? It would probably be destroyed in a catastrophic flood, but if rebuilding cost was factored into the budget, it would still probably be a less expensive option. I know that this goes against all planning tradition, but I think it is worth considering.

As a resident of the bluff which overlooks the mesa, I would also like to see included in the planning and restoration of the wetlands, a commitment to the removal of the nonnative and invasive eucalyptus trees which are thriving in two separate locations along the historic railroad grade. This is an opportunity for local property owners and the park service to work together to restore the integrity of this part of the wetland. I join my neighbors Kitty Whitman and Louis Jaffe in advocating this addition to the plan.

Thank you again for your fine work on this project.



Yours,

Tanis Walters

Tanis Walters
100 Overlook Rd
Pt Reyes Station

A16107

Dear Superintendent,

I wanted to show my support for Alternative D. I am always interested in whatever plan restores the land to the highest degree.

I'm not so supportive of a new parking, as in plan C.

Thanks for your attention.

Linda Dee Weisenberg
Box 823
Inverness CA. 94937

RECEIVED
Point Reyes
National Seashore
FEB 7 - '87
✓ SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
CC NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CC CENTRAL FILES

Point Reyes
National Seashore
FEB 14 '07
SUPT.
SCIENCE
SPEC PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP
CULT. RES.
MAINT
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES

Betty Wheelwright
P.O. Box 1359
Point Reyes Station, CA 94956
415.663.8759

February 13, 2007

Superintendent Don Neubacher
Point Reyes National Seashore
Point Reyes Station, CA 94956

Dear Superintendent Neubacher:

I appreciate the obvious care with which the Draft EIS/EIR for the Giacomini Wetlands has been done. Like many residents of Point Reyes Station, I look forward to the restoration of these wetlands and to the increased health of the Tomales Bay ecosystem.

I also appreciate the Park Service' efforts in **Alternative C** to accommodate the local community by building a bridge over Lagunitas creek that would link the existing southern perimeter footpath and the White House Pool. However, I support **Alternative D**, the environmentally preferred alternative, because I believe the Park Service' highest priority should be the restoration and health of the Giacomini Wetlands and Tomales Bay, not expanded public access. The Point Reyes National Seashore already has abundant access to its varied and rich natural resources. The existing White House Pool Trail and the proposed Dairy Overlook (in **Alternative D**) will provide limited access to the Giacomini Marsh.

I oppose the following aspects of **Alternative C**:

- **Bridge connection between existing southern perimeter path and While House Pool trail.**

  A safe bicycle and pedestrian path between Point Reyes Station and Inverness Park would best be achieved by widening Levee Road. Widening Levee Road would be less expensive than the proposal for the bridge in Alternative C, and it would meet community needs while allowing the maximum restoration of the wetlands.

- **Mesa Spur Trail**

  I'm opposed to the Mesa Spur Trail because I believe that it could easily become a public nuisance. It would attract people to an area that would be hard to supervise and would bring excessive amount of traffic onto Mesa Road and into the surrounding residential area.

- **Improved Trail Access at Green Bridge**

  I support the proposed improvement of trail access at Green Bridge.

- **Access to Dairy Overlook**

  The access to the Dairy Overlook should be from C Street at a location between 4th and 6th Streets. Like many residents in Point Reyes Station, I don't want the access to the Dairy Overlook via Third Street. I'm concerned that Third Street will be overloaded with traffic. The turn from State Route 1 onto Third Street is already congested and, at times, dangerous.

I believe that Alternative D will maximize the marsh restoration while doing as much as possible to protect the historic character of downtown Point Reyes Station. Those of us who live in Point Reyes Station support the restoration of the marsh, but we want it to be done in a manner that doesn't destroy the character of the town in which we live. Imagine what would happen to Point Reyes Station if it were located where the parking lot for Bear Valley Trail is right now. Those of us who live in Point Reyes Station have made a considerable investment in the community where we live, and many of us have supported the restoration of the Giacomini Marsh. We are asking the Park Service to do the right thing environmentally and the right thing for the preservation of the historic downtown by implementing **Alternative D**.

Sincerely,

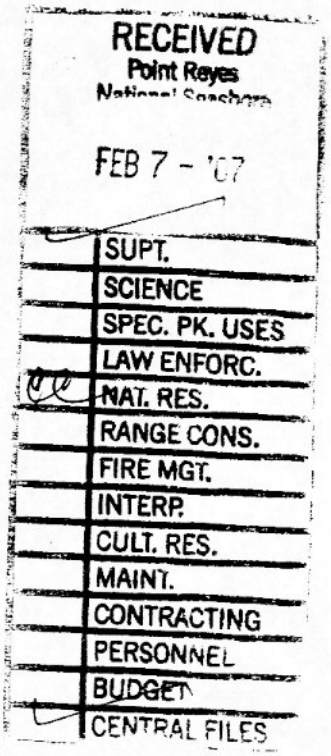
Betty Wheelwright

Betty Wheelwright

"Michael and Barbara Whitt"
<mbwhitt@svn.net>
02/06/2007 09:10 PM
PST
Please respond to
"Michael and Barbara Whitt"

To: <park_planning@nps.gov>
cc:
Subject: Giacomini Wetlands Restoration Plan

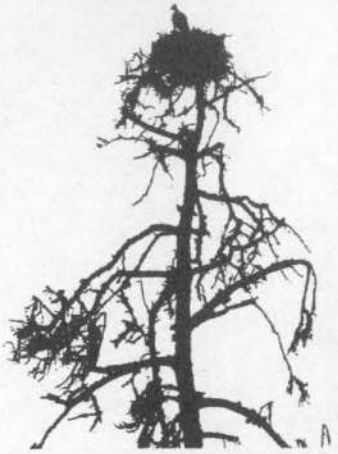
I strongly favor Alternative D for the following reasons: the primary purpose of purchasing the ranch was to return it to wetlands, which in turn would restore the bay and its ecosystem to a more pristine state; any traffic through the wetlands would diminish their function and degrade their value to wildlife; access around the edges already exists; it is not the duty of the NPS to provide transportation routes through sensitive habitat. I know the park service has been the victim of some bad publicity recently, but I don't think it necessary to sacrifice its mission to appease its critics. What makes this area a national treasure is its beauty, serenity and
wildlife values, which have always been so ably protected by the PRNS & GGNRA, in harmony with dairy ranching and agriculture, a model for the rest of the country.
Thank you for considering my views. Sincerely, Michael Whitt M.D., PO Box 240, Pt. Reyes Sta, CA 94956 (a physician in the community of Pt Reyes for 37 years)



Point Reyes
National Seashore

FEB 9 - '07

SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
NAT. RES.
RANGE CONS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES



2-7-7

Don Neubacher
Superintendent
Pt Reyes Nat'l Seashore

Dear Don,

Gracomma Wetlands Restoration Plan

I hope you will implement Alternative D for the Gracomma Wetlands. I have not talked to Jules and Tupper recently, but I am sure they support D. I know that the park has taken a lot of criticism over the past few years, but I hope you won't let that influence your decision. The public already has access to the marsh, as much as they need for esthetics and wildlife viewing. Grounding a path through the marsh to get from one place to another is, as I'm sure you know, not in the spirit of preservation.

Enclosed is a poem I wrote about Bear Valley years ago. I don't know if you ever saw it. The marsh-to-be - as well as many other special places in the Park - could inspire a similar poem in Feeley.

Thanks for hearing me out.
Working the Parks a happy 2007.

Michael Smith

All around the yellow field
the forest like a boundary
between the known and unknown,
the seeker and his quarry,
embraced and held my joy.

I was filled with the meadow,
my spirit soared upward
like the steepled fir,
and I felt what
any lover
of this meadow
had known:
It was a place
no *one* should ever own.

Point Reyes National Seashore

Bear Valley Meadow

for Ane Rovetta

When I first walked here
the meadow filled my mind,
spread before me and behind,
as if my whole life were contained
in its open expanse.
The island of fir and bay,
chattering with woodpeckers,
pointed to the sky.

"Dorothy&Geoff White"
<doge@svn.net>
02/11/2007 08:26 PM
PST

To: <Park_Planning@nps.gov>
cc:
Subject: Giacomini Wetlands Project Planning

Dear Supt. Don Neubacher et alii:

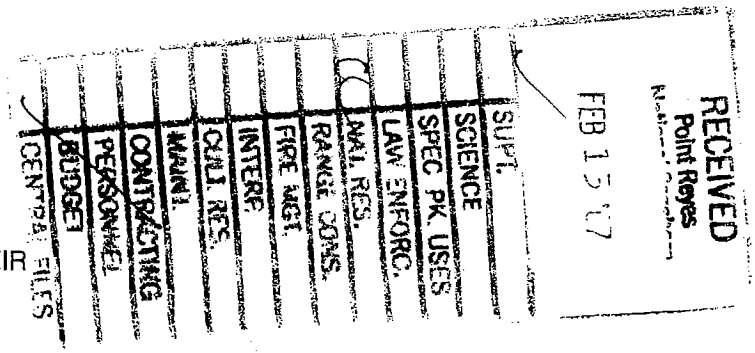
First of all my wife and I would like to thank you for all the good work you have done in acquiring these lands for the Seashore and in laying out the alternative possibilities for its treatment. We lived in Inverness for twenty-one years, and we know how important this area is to the health of the park and to the public's use and enjoyment.

We would urge you to adopt the general outline of plan D, perhaps with certain modifications. We know that the bridge over Paper Mill Creek that is being considered is highly controversial and also expensive, and that it is opposed by many people with whose general concept of how to treat the area we agree. Nevertheless, if budgetary restraints permit it, it is our personal opinion that it should be built. The possibility of highway-free foot passage from Point Reyes Station to White House Pool has always seemed to me intriguing and desirable, and I hope it might be incorporated in whatever plans you ultimately adopt.

Whatever decisions you may make in this and other matters concerning the wetlands, we will be looking forward with great eagerness to watching the transformation of this vital area.

Regards, Geoff & Dorothy White

RECEIVED
Point Reyes
National Seashore
FEB 12 '07
SUPT.
SCIENCE
SPEC. PK. USES
LAW ENFORC.
WILDL. RES.
RANGE COMS.
FIRE MGT.
INTERP.
CULT. RES.
MAINT.
CONTRACTING
PERSONNEL
BUDGET
CENTRAL FILES



Attn: Superintendent
Giacomini Wetlands Restoration Project DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Dear Giacomini Wetlands Restoration Project management team:

I have reviewed the EIR in some detail and am delighted by the extensive plans to restore the present Giacomini property to wetlands. I concur with many local residents in preferring Alternative D, the "environmentally preferred alternative" with the addition of a bridge across Lagunitas Creek near the old summer dam, securing an off-road alternative trail along the Levee Rd. corridor. I would prefer to see funds available for ongoing invasive plant removal rather than construction and maintenance of new overlook infrastructure.

I was surprised to find little mention in any of the alternatives of exotic plant removal in the mesic coastal scrub area of the Pt. Reyes mesa bluff (one or two clumps of Pampas grass on the Tomasini Creek channel berm were called out for removal). A significant number of trees in the extensive eucalyptus stand bordering the Martinelli Ranch fall within the project area, with broom and other invasive plants spreading from their understory. I would like to advocate for a cooperative effort between private landholders and the park service for the removal of this stand during the initial phase of the Giacomini Wetlands Restoration Project. Difficulties of access will make their removal prohibitively expensive after the levees are breached, given the steep and erosive bluff on which they are growing. This may be the first and last chance for the trees' removal.

Many thanks for your impressive efforts to make this project happen. Hats off!

Sincerely,

Kitty Whitman 2/10/07

Kitty Whitman
88 Overlook Rd.
Point Reyes Station, CA 94956
(415) 663-1474

Rationale for the removal of eucalyptus stand on the Pt. Reyes mesa bluff at the project area/Martinelli Ranch boundary

*The trees are considered a noxious and aggressively spreading pest of immediate concern according to the Seashore's Exotic Plant Management Plan. Fire safety for both homes and habitat would be improved by their removal.

*The trees on the levee and the old railroad grade are unstable, eroding the bank, and compromising the integrity of the Tomasini Creek channel levee. The channel is considered essential to maintaining habitat for the endangered Tidewater goby for the next ten to twenty year period. Continued creekside erosion in this area would undermine the efforts of the Giacomini Wetland Restoration Project to improve water quality in Tomales Bay.

*The trees interfere with hydrology of the bluff. After restoration, Tomasini Creek's current channel will depend on perennial or seasonal seep flow from the Mesa to create the brackish condition required by the Tidewater goby. Freshwater flows should increase following the trees' removal. The less stagnant the channel, the lower the mosquito risk for residents.

*The understory of the eucalyptus stand supports little native vegetation and harbors non-native plants considered Category 1 by the Seashore, highest priority for control or eradication. As long as the stand remains, it will serve as a nursery for invasive plants such as broom and Himalayan blackberry which will spread south into the mesic coastal scrub. The continous removal of these exotics would be a maintenance nuisance for the park and the homeowners in an area with extensive poison oak and dense willow thickets.

* The mesic scrub ecosystem at the foot of Pt. Reyes mesa has been found to be key riparian habitat, with 10% of birds observed in the project area during winter occurring in the bluff area. Revegetation of this section of bluff following exotic plant removal would comply with the Giacomini Wetland Restoration Project's stated objective of creating more riparian habitat, forming an unbroken habitat corridor between the Martinelli and Giacomini lands. Additionally, native vegetation would help to stabilize the creek bank.

* The viewshed opportunities from the proposed Tomales Bay trailhead spur trail are compromised by this eucalyptus stand. Views of the shallow shorebird area and the Point Reyes mesa bluff are blocked by the eucalyptus trees at the terminus of the proposed trail. Their removal would substantially enhance the intactness of the native landscape. Secondarily, replacing the trees with an arroyo willow and coyote brush thicket would inhibit the public from wandering into the area of protected habitat at the trail's terminus.

* Marin County's Local Coastal Plan and the Point Reyes Community Plan also call for exotic plant removal along the Pt. Reyes mesa bluff to preserve the physical, ecological and visual integrity of the area. Cooperation between federal, county and local agencies could streamline the permitting process for adjacent landholders.

* Given the prevailing winds and the eastward trend of the mesa's geography, this eucalyptus stand is not serving as a windbreak for residents. Its removal will restore natural wind conditions to the project area.

* A cooperative federal/private effort would expedite the process in various additional ways: 1) the trees could be felled across property boundaries, reducing costs to both parties 2) hauling away the tree material on still extant ranch roads rather than transporting them up the bluff and through residential neighborhoods would reduce impacts; 3) an exceptable regime for managing re-sprouts adjacent to the wetland could be agreed upon 4) and a revegetation plan could be jointly arrived at and implemented with professional oversight.

February 5, 2007

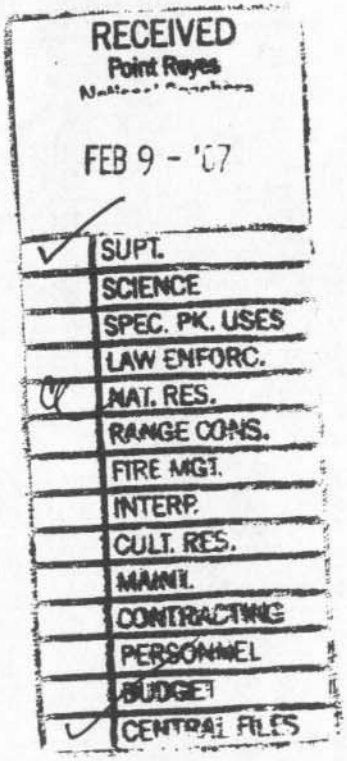
Superintendent

Pt. Reyes Natl. Seashore
1 Bear Valley Road
Pt. Reyes Station, CA, 94956

Dear Don and Lorraine,

I am a resident on Mesa Road, living just above the Giacomini Ranch, and quite acustomed to the hoards of tourists coming into town on the weekends, over crowding the once quiet, sensible town. I am afraid, like many other residents, that if there does happen to be an open spur trail on the Mesa, there will be no silence, no space in town, and no room for endangered animals such as the goby, the red -legged frog and the steel head trout. I am joining many others in asking you to please think about what these huge factors could do to change this town for the worse.

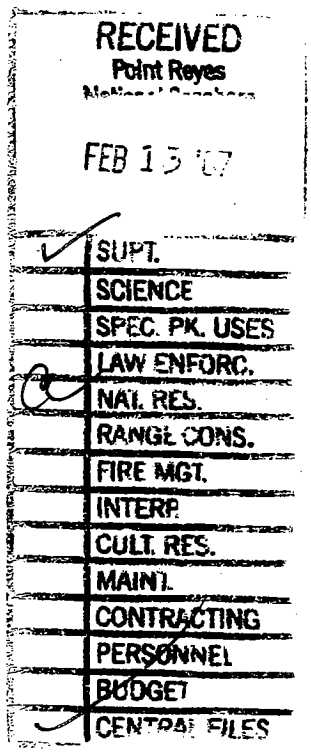
I vote YES on proposition D



Thank you,
Maria Wilson

Maria Wilson

350 Mesa road
Point Reyes Station
Girlontheloose14@yahoo.com



Douglas Wright & Lillian Hames-Wright
180 Third Street
PO Box 1116
Point Reyes Station, CA 94956

February 12, 2007

ATTN: Superintendent
Giacomini Wetland Restoration Project DEIS/EIR
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, CA 94956

Re: Comments on Giacomini Wetland Restoration Project DEIS/EIR

To Whom It May Concern:

At the request of the NPS, we offered public scoping comments in a letter dated November 5, 2002 concerning a number of issues that we believed should be examined in the NEPA/CEQA process. We are pleased that a number of those issues have been addressed in the DEIS/EIR. However, the Draft document does not respond to several other matters set forth in 2002, and so our comments at this time reflect these continuing concerns. We would like to offer the following comments on the Draft EIS/EIR:

1. We appreciate that the NPS believes it is appropriate to designate a "preferred alternative" and an "environmentally preferred alternative". We also understand that on the basis of comments on the Draft document, and further considerations of the matter by the NPS, that the resulting restoration plan may very well incorporate elements from two or more of the alternatives examined. Consequently, we are not inclined to offer a preference for a specific alternative set forth in the Draft document.

2. Regarding **hydrology**, we wish to once again address a number of matters at a location that was within the original project area, near the intersection of Third and C Streets in Point Reyes Station.

a. Along the west side, or project side, of C Street, between Third Street and some point north of Fourth Street, there has been a consistent history of hydrological activity that the

DEIS/EIR does not address, even though: one, the NPS currently owns a portion of the land that is subject to this activity; and two, the amount of activity would suggest to us that the hydrology should certainly be considered in terms of its relationship to the restoration project.

For years, water pooling has occurred in the cow pens that are located near the intersection of Fourth and C Streets. A similar but smaller pooling of water has occurred south of that location, in the cow pen between Third and Fourth Streets. From an historic standpoint, long-time local residents recall that when Fourth Street - that is, the block between B and C Streets - was filled, a natural drainage channel was covered by the fill on Fourth Street. Although it may be possible that the pools are spring-fed on-site, as well, this history suggests that the pooling is fed from beneath Fourth Street.

This drainage system emerges in the cow pen which, although it has also been subject to fill, is at a lower elevation than Fourth Street. As evidence of the drainage and pooling, approximately twenty years ago the Giacomini ranch installed a tile and gravel "French drain" in order to pipe the water away from the cow pens, but this device failed in operation. Recently, in conjunction with the January 25 NPS meeting, several of us inspected the pooling. On a date which followed over four weeks of virtually no precipitation, standing water was visible in several locations in the cow pen, particularly in the area west of the end of Fourth Street.

These water flows are not examined in the DEIS/EIR, although it is apparent that the water emerging from this underground drainage system is seeking a path to the south and/or west, through the restoration area to lower elevations near Lagunitas Creek. We believe that the analysis should include consideration of this hydrology and that there should be an explanation of why the property currently owned by the NPS at this location, as well as the property (tract 05-165) excluded from the Giacomini purchase, should not be considered integral to the restoration and included in the project. Why has this drainage system not been included in the DEIS/EIR analysis? Why does the NPS choose not to address this hydrology matter on property which was originally intended to be part of the restoration project and which is in part owned by the NPS?

b. In the event that the aforementioned parcels were to be included in the restoration project, and the plans to remove the levee, the road leading to the levee from C Street, and the removal of fill from the area adjacent to C Street, are realized, what would the impact of this be upon the future vegetation resources along that path? Over the course of the past 20 years, a line of willows and other low growth has occurred adjacent to our property within the (state-owned) open space that lies southwest of the corner of Third and C Street. Although this growth is characterized in the DEIS/EIR as being viewed "negatively" by property owners (us, we assume), we actually view it as positive since it has provided a lively new habitat for a variety of bird and animal species.

Were the aforementioned (2.a) hydrology system to the north along C Street to be incorporated into the restoration project, the opportunity would be provided for a further restoration of habitat, perhaps in the form of additional willows and low growth, but in

whatever form establishing continuity of vegetation northward, adjacent to C Street. This growth would be fostered by the drainage systems previously noted and a fine, natural boundary to the restoration area would be formed. We ask why incorporation of this opportunity has not been considered and examined?

c. It is noted in the DEIS/EIR (page 191) that run-off from a considerable portion of the streets of Point Reyes Station is channeled into the open space at a point near the intersection of Third and C Streets. We have always assumed that this is a contaminated water source and that the (seasonal) flow of this water may change its course once the restoration project removes the levee, removes the road to the levee, and reduces the level of filled pasture aside the levee. We believed that the DEIS/EIR presented an opportunity to examine the impacts of this runoff upon the existing and future habitat, and if necessary, to address possible mitigation measures. We have not been able to find any such consideration in the Draft document, other than the brief description cited, and ask why this impact is not addressed?

3. Regarding **public access**, we appreciate the recognition in the Draft document that creating a trailhead in the vicinity of Third and C Streets in Point Reyes Station, thereby formalizing the informal trailhead that has existed there for years, would have "moderate" (negative) impacts upon that location in terms of parking and traffic. Certainly, given the fact that there is no off-street parking provided, now, or in the plans described in the DEIS/EIR, creation of a trailhead at this location would indeed have negative parking and traffic impacts at the location. Although we have no objection to pedestrian and bike movements at this location, the streets serving this residential enclave do not have the capacity to handle the traffic that would be anticipated if a formal and signed trailhead were created. Locating parking and a trailhead that is immediately accessible to Route 101, as is proposed in Alternatives C and D, is logical in terms of addressing the impacts of auto movement and parking.

4. The **project definition**, or boundary, remains a curious matter to us, and the history of the proposed property exchange, initiated in early 2006, should not be disregarded in the context of the DEIS/EIR. Certainly this history of the restoration project has been largely ignored in the Draft document. Why does the DEIS/EIR not provide a description, or history, of the changes in the project area definition, between the time of the original purchase and now? Why is there no explanation or rationale provided for the implicit (as represented in the Draft document) decision on the part of the NPS to not include the parcels along C Street, and specifically the lower elevation parcels adjacent to C Street from Third Street north of Fourth Street, within the restoration project?

5. The DEIS/EIR discussion of **visual resources** is curious and raises some questions. It is noted that the existing view of the restoration area from C Street in Point Reyes Station is "obscured" by a "25-foot tall stand" of Cypress trees (p. 327). In fact, these trees are less a "stand" than a "row" that lines the west edge of C Street from a point south of its intersection with Fourth Street north to its intersection with Fifth Street. The trees are, we believe, within the County-owned right-of-way, and they exist because they

were planted originally to mitigate the visual impacts of the operating dairy farm from the village.

In the past, we have stood on C Street with NPS staff and discussed the view opportunities that would be provided, along C Street, when the restoration project is realized, since C Street would afford a fine view, to the west and north, of the southern portion of the project area. Of course, it was assumed in these discussions that: one, the NPS would adhere to its original concept for the project and purchase all of the parcels along the south blocks of C Street; and two, that the Cypress trees, their purpose no longer existent, would be removed. Why have these considerations, in terms of public visual resources, been ignored in the Draft document?

6. We would also like to take this opportunity to offer some brief comments on further **project funding**, in light of: one, the brief history of the project's acquisition phase (on page 7); two, the status of the five parcels that were removed from the original purchase, at the request of the Giacomini family; and three, the statement on page 8 of the DEIS/EIR which is apparently referring to a second proposed land exchange.

Per our comments, above, regarding project definition, it does seem unnecessary for the NPS to consider an exchange of property in order to secure the lowland parcels adjacent to Inverness Park, of for that matter, to secure those low elevation parcels adjacent to C Street (which we believe should be part of the restoration project area).

The DEIS/EIR explains well (on pages 8-9) the justification for the Giacomini wetland restoration effort. The loss of wetlands in California has been documented in countless studies and publications over the years. Consequently, the opportunity presented by the Giacomini restoration effort is an important counter to this historic trend, and if my understanding is correct, the location and scale of this restoration project makes it one of the most important efforts of its kind on the west coast.

That being the case, it would seem that the project should have been, and continue to be, a very high priority for funding from any number of public and private entities. Certainly, past funding commitments to the project reflect its significance. However, since our discussions in early 2006, in the context of debating the then-proposed property exchange, the funding picture has improved significantly. As we suggested at that time, changes in national administration, in the make-up of congress, and in Sacramento, can have a major affect upon the level of potential funding.

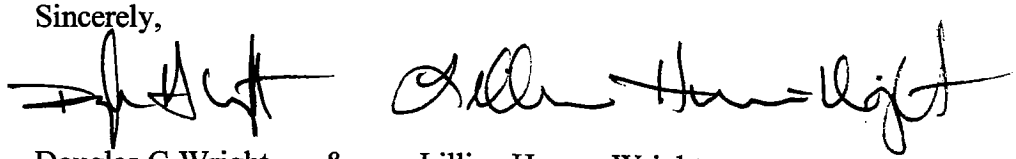
There continue to be an array of specific funding sources for acquisition and restoration of wetlands, including US Fish & Wildlife grant programs (specifically those aimed at endangered species habitat, appropriate for the Inverness Park parcel), EPA accounts, Caltrans mitigation funding, and private donor funds, all of which have provided, or could provide, (additional) increments of funding for the Giacomini project. To this point, we note the announcement within the past week a $1 million grant from the National Coastal Wetlands Program was secured for the restoration project.

Moreover, in November of last year, California voters passed Proposition 84, which is estimated (by the Trust for Public Land) to provide a total of $350 million for wetlands acquisition and restoration. Certainly, the Giacomini project would compete well for this funding, for either acquisition or restoration, or both. In addition to Prop. 84, California also passed Proposition 1B, which could help the Giacomini project meet other specific funding needs. A new congress, with a new majority, has begun business in Washington, and already there is talk of serious funding for the LWCF, a budget recommendation addressing the backlog of NPS unfunded needs, and an energized focus on environmental initiatives.

Given its scale and significance, the Giacomini restoration project should be a highly visible, very attractive, and priority candidate for additional funding. The opportunity to actively pursue established as well as new funding sources for a project of this importance suggests that the possibility to do more, rather than less, within the project's scope is very real. It also impugns the viewpoint that a property exchange - one that gives up NPSW resources that could otherwise add to the project's quality - is somehow necessary to accomplish a project that would as a result be "less" than it need be.

The original project concept made a great deal of sense, in terms of removing non-compatible agricultural uses from a restoration setting, as well as defining a project in a logical manner that would enhance view opportunities, preclude possible future development impacts upon the newly restored habitat, and offer a project with clear, undistorted boundaries. We very much support efforts to find funding in order to expand, rather than diminish, the project, and would be pleased to assist in any way possible.

Sincerely,



Douglas G Wright & Lillian Hames-Wright

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Excellent long term work by the Park Service -

Thank you Doc & team

I support option D with the addition of the bridge/path*.

(public access)

Provided County follows Park's lead with trail design

(not too wide/environmentally sensitive)

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

Please be SURE to include a through path from White House Pool to Pt. Reyes

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

THE EFFECT ON RESIDENTS OF PRS !!! IMPACT OF MORE PARKING, TRAFFIC, NOISE, CROWDEDNESS. WHY HAVE AN OVERLOOK RIGHT IN OUR DOWNTOWN !!

CHECK THE ADDRESSES OF PEOPLE WHO ARE WANTING THIS. THEY PROBABLY DON'T LIVE HERE

Point Reyes National Seashore

Giacomini Wetland Restoration Project Meeting

January 25, 2007

Please add any additional issues that were not brought up at this meeting:

I prefer Alternative D because I am concerned about the impact of a public trail along Lagunitas Creek. I recommend that, if there is a connector trail, it be a small path & bridge to accomodate walkers only - this would truly be a local access trail.